VETERINARY MEDICINE

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VOL. XXVII

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

Clawson, of the University of Minnesota Medical School, has prepared a bacterin from the *Streptococcus viridans,* which so far as tested, constitutes a successful treatment for rheumatism. Clawson has repeatedly isolated this organism from the blood of patients having both acute and chronic types of arthritis.

About one person in 20,000 receiving horse serum develops alarming symptoms of allergic reaction and about one in 50,000 dies. Bronfenbrenner of the Washington University, has devised a chemical means of treatment of horse serum which, it is believed, will entirely eliminate this unfavorable reaction.

Staub carried out an experiment in a swine herd near Paris in which there had been enormous losses from hog cholera for many years. A dose of 5cc of serum was injected into 665 pigs on the day after birth. Ten days later another 5cc dose of serum and a 0.1cc dose of virus were injected. There were no losses from cholera among this group of pigs although they were repeatedly exposed to natural infection and their immunity was later tested by the injection of 1cc of virus.

Coccidiosis of chickens is reported by Sawyer and Hamilton as being the most prevalent of poultry diseases in western Washington.

Contaminated milk caused 47 outbreaks of illness in the United States during 1930. In all but two instances unpasteurized milk was responsible for the trouble. The 47 epidemics involved a total of 1,953 cases and 54 deaths.

Sholl and Torrey, in a study of the pathology of the bovine udder, reached the conclusion that *Br. abortus* produces definite changes in the udder which may be quite extensive and may lower the efficiency of the organ to a considerable degree.

Fildes, Hare and Wright report, in the *Veterinary Record,* a case of tetanus in a cat. Infection occurred presumably in a wound caused by a trap in which the animal was caught, the injury resulting in dry gangrene, of one foreleg. The diagnosis was confirmed by laboratory examination. It is stated that no other record was found of tetanus in this animal. The rarity of the disease in the cat is presumably due to the high resistance of this animal to the *Cl. tetani,* experiments having shown that the cat is more than 2,000 times more resistant to tetanus toxin than is the horse.

The chance of producing a resistance to *Br. abortus* infection as a result of vaginal infection of unbred heifers with living cultures of the organism, appears to merit consideration, according to Edgington and Broerman.

General Ludendorff in his book on the World War points out that one of the principal disabilities that led to the downfall of the German armies was the shortage of remounts for artillery transport and cavalry.

Many metals are soluble in milk. The quality of dairy products, particularly the flavor, is influenced greatly by minute amounts of dissolved metals. Of the ordinary metal milk utensils aluminum was least and galvanized iron most affected by the corrosive effect of milk, according to an investigation made in Wisconsin. Stainless steel resisted both milk and cleaning fluids best of the metals tested.

A recent issue of *Science* reported the discovery of a new property of sodium amytal by Dr. Erich Lindemann of the psychopathic hospital of the University of Iowa.

Doctor Lindemann performed the experiment of giving a very small dose of sodium amytal to psychotic patients in the hospital and also to normal individuals. This dose, though too small to produce anesthesia or even sleepiness, had a decided effect on the emotions and on the subject's personal relations with those coming in contact with him.

The most striking effect on the normal subject was the desire to tell about personal matters which the individual would ordinarily want to keep hidden. Under the influence of this drug, a person is unable to refuse to give the answers to questions about the most intimate matters. He shows a warm emotional attitude toward others, and has a feeling of strength, self-confidence and serene contentment.

Critical tests have shown catechu, cresol, formaldehyde and areca nut when given by the mouth to be ineffective against coccidiosis of chickens.

Seven different species of lice infest chickens, four different species infest turkeys, three species are peculiar to geese and ducks, and two species different from those found on other birds, infest pigeons. A dip composed of one ounce of sodium fluoride to the gallon of water is effective against all species of bird lice.

WHALE OIL DISPLACES LARD

It may be of interest to know that the whale oil industry is rapidly coming to that point where it offers serious competition to American lard. In Germany alone importations of American lard dropped from 214,932,970 pounds in 1929 to 111,847,132 pounds in 1930. In 1919-1920 it was estimated that 407,000 barrels of whale oil were produced. Each barrel weighs 400 pounds. In 1928-1929, 1,319,000 barrels were produced. It is estimated that the whaling fleets in operation this year will have a capacity of 3,000,000 barrels. All of this whale oil can not hurt good lean cuts of pork with just the right proportion of fat, but it can and is hurting the lard market. The wise producer needs to study his whales along with other factors in planning his swine production program.

Endoscopy—Photo by Horning

A CASE OF ACUTE TOXEMIA

Subject.—A two-year-old male Scotch terrier.

History.—The previous history was essentially negative. The animal had been treated at intervals since it was three months old for recurrent attacks of otitis externa. His diet consisted of boiled or raw chopped beef with small amounts of puppy biscuits and some cooked vegetables.

Symptoms.—June 17th: General listlessness, anorexia, lethargic, bowel elimination had been normal, temperature 103.4 deg. F., normal respiratory rate, slightly accelerated pulse, had voided small quantity of dark colored urine, palpation and auscultation negative. An enema of saline solution produced good results.

The dog was given one-half ounce castor oil and sent home with this prescription:

Elix. Ferri-Quininae-Strych.
Elix. Saw Palmetto Comp.
Elix. Digestans aa.

June 18th: Same symptoms as on the preceding day but greater depression. The oil had operated satisfactorily. The patient had vomited 3 or 4 times that morning. The same internal treatment was prescribed plus bismuth subcarbonate and sodium bicarbonate.

June 19th: The patient was considerably worse; disinclined to move, partially stupefied. Temperature 103 deg., brachycardia, diminished respirations, congested conjunctiva, mouth dry, fetid breath, palpation showed tenderness over the stomach. Ophthalmoscope examination showed normal fundus and dilated iris. Fluoroscope showed lessened peristalsis, as a barium meal took twice the usual time to pass through the duodenum and jejunum. Analysis of catheterized specimen of urine showed double plus indican and albumin too little to estimate quantitatively. The animal was hospitalized on this date.

Diagnosis.—Acute toxemia.

Treatment.—Hypodermoclysis of normal saline solution—100cc every four hours, Caffeine and sodium benzoate every four hours, intramuscularly. Whiskey and milk every two hours and an enema of warm saline solution.

June 20th, A. M.: The dog was slightly better, had an improved cardiac tone. The amount and frequency of hypodermoclysis and caffeine was reduced. There was slight dyspnea apparently due to gastric dilation. It was relieved by passing a stomach tube and administering calcium carbonate and magnesium carbonate. The patient voided plenty of clear urine.

Same day, P. M.: Marked dyspnea due to development of a pulmonary hyperemia. A camphorated oil jacket was applied to the chest.

June 21st: Generally improved tone, hyperpnea but good cardiac action, took raw chopped beef. Hypodermoclysis and caffeine injections were discontinued and Pit-Ren (pituitary and adrenal glandular extract) capsules were given instead.

June 22nd-25th: The patient was making an uneventful recovery and the pulmonary involvement subsiding nicely.

This dog was seen again six weeks later on account of polyuria. Urinalysis showed slight albuminuria with a few hyaline casts. The dog was normal otherwise.

Remarks.—(1) This was a case of acute toxemia caused by an unknown toxic agent, probably referable to the intestinal canal, with secondary changes in the renal and pulmonary tissue.

(2) There is an indication for future urinalyses in this patient to determine the extent of the renal lesion.

(3) The therapeutic value of hypodermoclysis in this type of case is unquestioned.

Alfred W. Meyer,
New York Women's League for Animals.
New York, N. Y.

Why Neglect Feline Practice

By H. W. BROWN, Fort Wayne, Indiana

IN THE new age which has been termed the automotive age we hear the expression every day that the motor has in so many instances replaced the faithful old horse, that there is not so great a demand for the veterinarian's services as existed before the horse was so largely replaced.

We who are in practice now know that there is a greater field and one of wider scope for the trained veterinarian of today than ever existed in the United States when horses were practically the only animals that veterinarians were called upon to treat. Many veterinarians are enjoying a very good practice, exclusive of horse practice, in small cities which would not have supported a practitioner, exclusive of horse practice twenty years ago.

A branch of veterinary practice today, which if given a portion of time and consideration, will be remunerative in many ways, is that of feline medicine. It is a fact that this branch of veterinary medicine is and has been sadly neglected by a great many veterinarians.

The number of cats in the United States is greater than ever before and is increasing every year. Since there appears to be an increased interest in breeding thse animals, it behooves us as veterinarians to have a working knowledge of this animal in order that we may talk intelligently to their owners.

I do not pretend to be an authority on cats or their diseases, but their care and treatment was thrust upon me, as it is upon every other veterinarian in city practice, and I found it necessary to have in my equipment either a working knowledge of the breed or else turn the service away, and I chose the former.

As a practitioner I will jot down a few observations and experiences in feline practice, which may help some over rough spots.

In the United States there are two common breeds of cats, the short haired and the long haired or Persian. Many of the long haired variety are often incorrectly called Angora. Since the Angora is considered to be a strain of the Persian, the term Angora has been dropped, and all the long haired cats are called Persians and so registered by the cat clubs of America.

It is the opinion of many that the Persian cats are more delicate than the short haired varieties. This difference in vigor is usually caused by the difference in their care, Persian cats being more often pampered and given rich food; while the short haired varieties are given more liberty and thus live closer to nature.

Cats keep their coats reasonably clean by licking themselves with the tongue, which is as rough as a file, and this trait is the direct or indirect cause of many digestive disturbances which are brought about by swallowing loose hair.

The great difference in the methods of handling cats from that of handling dogs presents a problem which I believe is responsible for the fact that so many veterinarians take so little interest in cat practice. Cats, when excited, are the most difficult to control of all domestic animals. In handling cats one not only needs to protect one's self from a bite, but also to beware of their claws because they can do as much damage with any one of their four feet as they can with their teeth.

A dog, when excited, can be petted and talked to and will usually respond to correction, but not so with cats. If a cat is frightened or becomes excited, which they do from apparently little or no cause, they seem to revert at once to their wild instincts, and one has no more nor less than a wild animal, which requires strength and skill to handle and hold.

To illustrate: A cat was brought to my office and handed to me by the client. This cat, ordinarily a very gentle one, spied a dog and before I could get a proper hold, was trying to scratch and bite me in order to gain his freedom. I immediately dropped him upon the floor in hopes that he would seek refuge behind my office desk until he quieted down, but not so. He at once jumped on

the ledge of the window and with one terrific lunge went, head first, straight through the triple plate glass and on across the street between two houses and out of sight, and was not recovered until two days later when he came to the residence next door, and mewed to get in, where I caught him and returned him to the owner no worse for the experience.

I will not attempt to explain the different methods used in restraining cats but will mention just a few things which have aided us in their handling. The very first routine procedure when a cat is brought to the hospital is to cut the toe nails, thus avoiding a bad scratch-wound later on if, in the handling, one foot gets free. Not only the claws must be watched out for but cats will bite even more viciously than a dog and do it much quicker; making it absolutely necessary that all four feet and the head be securely held during an examination. This requires an assistant so that one may have a free hand to use in the examination.

It is not a good policy to depend upon the owner of the animal to hold it during the examination because if the cat gets excited and starts struggling to get loose the owner will immediately release all hold, either for fear of hurting the cat or of getting hurt himself. The veterinarian will be left with only a partial hold under such circumstances and if he is not very quick he will be either scratched or bitten or both before he can turn the animal loose. The veterinarian must learn that the cat is one animal which sometimes requires more skill to release than it does to catch it; and the assistant should be trained not to loose his hold until by a given signal both parties release their holds simultaneously.

Cats sharpen their claws on tree trunks when allowed to run outdoors, but when they are kept inside all the time they usually pick out the best piece of furniture in the house for their manicure. By cutting the nails one prevents the destruction of furniture and renders one's client a service for which he will come regularly, when once convinced of its benefits.

Another service which can be given with profit in feline work is that of bathing cats. This is not nearly so difficult as might seem if proper preparations are made beforehand.

First prepare a large basin of water slightly warmer than body temperature and place on the floor of an ordinary bath tub; then immerse the cat completely except for the head in the warm water, for three minutes. This procedure seems to weaken the cat. Then remove and place feet down on the floor of the bath tub and apply the soap until the animal is completely lathered. Finally dip back in the basin of clean water and repeat rinsing in clear water until all soap is removed. It is then necessary to dry the cat thoroughly and this can best be accomplished by the use of towels or, better yet, a hot air dryer which cats really like, after they become accustomed to the noise of the motor. They will dry much faster if they are combed as the dryer is applied. After drying they should be placed in a good warm kennel, not

subject to drafts, for at least twelve hours before returning them home.

Cats, especially Persians, however, should not be bathed too often for they will quit grooming themselves between baths and their coats will get ragged and full of snarls.

I have heard many veterinarians say that if they were compelled to bathe cats they would prefer to be counted out but I believe that is the wrong attitude to take. There are many clients who would not attempt to bathe their cats but would be glad to have the veterinarian bathe them, which as I have said is not such a difficult task. The successful accomplishment of the cat's bath may lead to an established confidence in one's ability to handle these animals and establish a clientele for various kinds of veterinary services which one had not anticipated.

I believe that as veterinarians we should give more thought to the minor details in small animal practice, such as cleaning teeth, bathing, clipping, manicuring and grooming. Even though it is not always as desirable as one could wish, it is necessary in order to establish a contact with the owner of the animal. If we let the kennel men give these minor services or compel our clients to go to him for such services by refusing to do them, we simply invite competition from that source in more strictly professional matters.

Endoscopy—Photo by Horning

NEOPLASM IN A CAT

Subject.—A six-year-old Persian cat.

History.—This animal presented a firm subcutaneous immovable mass on right posterior thoracic wall involving the ribs and extending into abdominal cavity where it could be palpated posteriorly as far as the lumbar region. The animal suffered no apparent discomfort from the mass; temperature and pulse were normal, the respiratory rate slightly accelerated, elimination normal and no evidence of cachexia. The owner first noticed the presence of the thoracic mass four months previously. There had been a uniformly regular increase in its size since then.

Roetgenography.—An X-ray plate revealed a mass involving thoracic wall, pleural and abdominal cavities. An interesting point brought out on the plate was a marked hypertrophy of the left kidney.

Autopsy.—Destruction was advised and the autopsy findings follow:

The tumor involved the entire right thoracic wall posterior to the sixth rib with degeneration of muscular and costal tissue. Numerous nodules studded the costal pleura. The posterior lobe of the right lung was adherent to the mass by fine strands of tissue which were easily broken by blunt dissection. The lungs and heart were normal. The mass extended into the abdominal cavity and was firmly attached to the sublumbar musculature ending at the third lumbar vertebra. The mass had enveloped the right kidney, which had undergone degeneration so completely that no evidence of its structural outline was discernible. The left kidney was about twice normal size, beautifully illustrating compensatory hypertrophy. The other abdominal organs were normal. There was no gross evidence of metastasis, and the lymph glands were negative.

Histo-pathology.—Microscopic section revealed an endothelial sarcoma with considerable necrosis and edema.

J. Stuart Crawford.

New Hyde Park, N. Y.

Epidural Anesthesia

By S. E. FERGUSON, Lake Geneva, Wisconsin

THIS type of anesthesia is called also, caudal block, regional, inter-coccygeal, intracaudal, intraspinal, spinal anesthesia, etc. I prefer the name epidural anesthesia because it really is blocking the nerve trunks outside the dura mater.

I first witnessed the use of epidural anesthesia in 1926 during a demonstration by Professor Franz Benesch of Vienna. At the time I was a junior student in the New York State Veterinary College at Cornell University. The subject anesthetized was a dairy cow. Since then the use of epidural anesthesia has extended to all the domestic animals and become generally employed. During the last four and one-half years we have used this type of anesthesia very frequently in our mixed practice and have found its indications to be numerous. This discussion, however, will be confined to the small animal field.

It has been our experience that each type of animal, i. e., equine, bovine and canine, requires a particular definite technic of its own in administration. This may be accounted for by the difference in anatomical structures and in the site of injection. In the beginning, with dogs, I found that in some I could make the injection very easily and rapidly, while in others I would fail completely. I read all available articles on the technic of administering this anesthesia in dogs and having just graduated I felt I knew my anatomy, but I finally had to dissect a dog to find out where the needle actually had to go. In this way a certain definite technic was evolved for this animal that eliminates failures and difficulties in the injection and uncertainty of outcome.

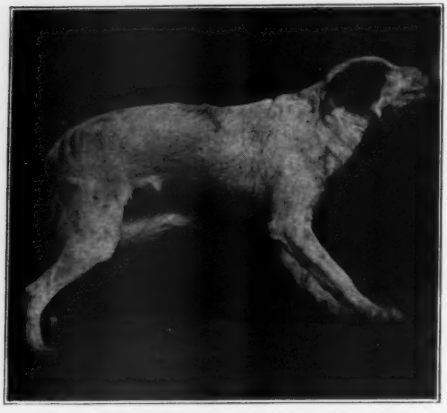
Before taking up the technic of administration and the indications for its use in the small animals, I wish to mention a few things about the anesthetic solution used. Apothesine is the local anesthetic which we use. We do not consider it better than any other but feel that it is as good as any; then too, because it has been used in our practice for a great many years and I have sort of grown up with it, we naturally felt more at home with it than with the others.

Apothesine is a local anesthetic of the procaine rather than the cocaine type. It is somewhat slower in action than procaine and relatively ineffective when applied to mucous membrane. Its toxicity is lower than cocaine (as 4 to 3) and about twice as great as that of procaine (as 2 to 4). Somewhat stronger solutions are required than are necessary with procaine. Apothesine is manufactured by Parke, Davis and Company. We use it in tablets containing apothesine, 0.3 gm. (4.8 grs.) and adrenalin, 0.0003 gm. (1/200 gr.). We make up all of our local anesthetics for ordinary hypodermic use with physiological saline solution. One tablet (4.8 grs. apothesine and 1/200 gr. adrenalin), dissolved in one ounce physiologic salt solution makes a 1% solution of apothesine, with adrenalin 1 to 100,000 (approximately). We have found through experience that stronger solutions are better adapted to certain fields and particularly for epidural anesthesia, as will be shown later.

We always give ¼ gr. of morphine sulphate about fifteen minutes before the epidural injection. This we have found, in the majority of cases, empties the stomach, the bladder and rectum. Then, too, the dog does not move about so freely when the needle is being passed into the sacral canal. We tried using a little of the local anesthetic in the skin and superficial tissue but found that the dog would wince with pain when the needle entered the sacral canal and the needle would be thrown out of line. Then, too, most dogs are hard to hold in position without a narcotic.

After the morphine has taken effect, the dog is brought from its kennel and placed on a flat table in a standing position and muzzled. An assistant holds its head by catching the loose skin under the jaws with one hand. His other hand is placed flatly on the abdomen just in front of the hind legs. With this hand, the assistant elevates the posterior portion of the dog's body until

most of the weight is removed from the hind legs. By so doing the posterior portion of the sacrum has a tendency to drop downward, thus increasing the space between the last lumbar and first sacral vertebrae. In the dog, as will be recalled, there are three sacral vertebrae which are fused, therefore any body movement which will lower the posterior portion of the sacrum will facilitate the passage of the needle into an inter-



The needle in situ for epidural injection in the dog—Photo by Frank

vertebral space. For the practitioner who is alone, the dog's head may be tied both ways and the rear held properly by placing a belt or sling around the abdomen in the posterior lumbar region and then elevating this by means of a pulley suspended from the ceiling. The hind feet should not be pulled off the table but the body weight should be lifted until the feet just touch the table. In handling the larger dogs, I believe I prefer the latter method to the services of an assistant. In administering the anesthetic a glass syringe and a 22-gauge needle, two inches long, are used. This length meets the requirements of all dogs.

During the past year I have been using a 4% solution and find this the most satisfactory. When I first started I used a 1% solution and injected from 8cc to 15cc, depending on the size of the dog. I found this slow in some cases, disappointing in others, and discontinued it after I killed a four-month-old pup with 10cc (1.6grs Apothesine). I then changed to a 2% solution, but with females failed to get complete anesthesia around the ovaries, especially when they were in estrum, so I decided to use a 4% solution and have obtained my best results with it. In using procaine or other agent, one would of course keep in mind its relative strength and the solution used would be correspondingly diluted. In small dogs and puppies (2 to 4 months old) we use 2cc; in middle sized dogs 3 to 4cc and in large fully developed dogs 5 to 6cc. This sounds like an unheard of amount of apothesine to be using (3.2grs. in 5cc or 1.15grs. in 2cc), but the results are more satisfactory than when a lesser concentration and consequently more volume are used. Oftentimes I have thought that it is the large volume of solution necessitated by a 1% solution that caused the paralysis or other untoward sequellae, as the solution was forced too far anteriorly, and too much pressure was incurred.

The proper location for inserting the needle is readily found by median line palpation starting at the base of the tail and working forward. The super spinous processes of the lumbar vertebrae are very discrete and high. When the depression between the first sacral and last lumbar is located, the skin over the area is cleaned with alcohol. The needle is then taken from the syringe and inserted on a true median line and in a perpendicular plane in this depression and gently passed into the sacral canal. I have found that with dogs which have a sloping sacrum or rump (Russian wolf hounds, etc.), the needle may be angled slightly backwards to facilitate entrance. In the straight back dogs the perpendicular position should be maintained.

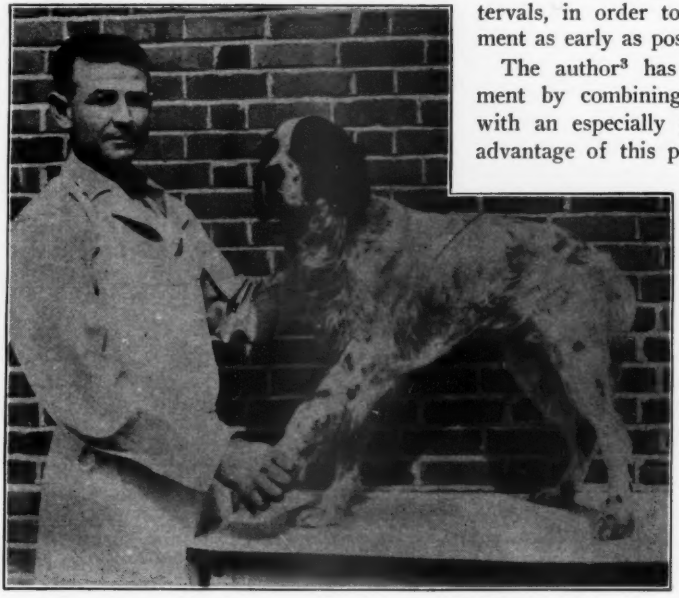
If the needle hits bone before one "feels" that the canal has been entered, one of two things will usually be found wrong: The point of the needle has angled to one side and is not on a perpendicular line, or it has been inserted a quarter of an inch or more too far forward or backward. In either case it should be retracted half way or the entire way and a new effort made until one gets the "feel" of the canal. Perhaps for some a 20-gauge needle would be better.

To the inexperienced operator I would say

do not inject your solution until you get the "feel" of the canal or of having your needle pass between two bones. If you still continue to have trouble I would advise dissecting a dog at your first opportunity and in this way establish a proper technic of injection. After the solution is slowly injected and the needle withdrawn, the posterior portion of the body is elevated. It usually takes from fifteen to twenty minutes for the anesthetic to take effect. When it is complete there is a paralysis of the posterior limbs and a relaxation of the posterior organs. If morphine is given as a preliminary, the dog becomes very quiescent.

We have performed the following operations, for the most part unassisted, with the use of epidural anesthesia: Celiohysterooophorectomy; cystotomy; caesarian section; removal of melanosarcoma of mammae; removal of mammae; caudectomy (mature dogs); castration; removal of urethral calculi; hernias (umbilical, inguinal, mechanical); cryptorchidectomy and cecectomy.

In cats the same technic is carried out except the preliminary morphine sulphate is not used. Here we use a 2% solution of Apothesine instead of a 4%. A 22-gauge needle an inch long is used and a little of the solution is injected into the skin and superficial tissue to relieve excessive sensation. In cats I have found it best to keep the needle perpendicular. In mature cats from 3cc to 5cc of the 2% solution is injected, in younger cats from 2cc to 2½cc. To date we have used spinal anesthesia in cats only in spaying and consider it more satisfactory for this purpose than ether anesthesia.



International Newsreel Photo.

English setter affected with Osteosarcoma. This dog was sent from New Brunswick, New Jersey to the Mayo Clinic at Rochester, Minnesota, for treatment

DIAGNOSIS AND TREATMENT OF EAR-MITES IN FOXES[3]

Attention is called to the indifference displayed by foxes when infested with ear mites. The disease is therefore easily overlooked in the beginning stages and may lead to severe complications before suspicion is aroused by the behavior of the animal. The breeder is therefore warranted in having the animals examined for mites at regular intervals, in order to apply necessary treatment as early as possible.

The author[3] has modified Hall's treatment by combining the tetrachlorethylene with an especially prepared paste. As an advantage of this preparation it is claimed that the chlorated hydrocarbon does not evaporate so readily from it; it is less sticky to use; it reduces the number of treatments to two applications at 4 to 6 day intervals. The preparation is put up by the firm Marienfelde under the trade name of "Viscopast." — Fritz Volkmar.

[3] Sprehn, C. Remarks on the Ear Mites of Fur Bearing Animals. *Tierärztl. Rundschau* 37 (1931): 93.

Ear Mange in Foxes: Its Treatment and Eradication

By KARL B. HANSON, Saratoga Springs, New York,
United States Experiment Station

Ear mange, or auricular scabies, is a parasitic disease caused by infestation of the inner surface of the ears by *Otodectes cynotis*. Specimens of this parasite are just barely visible to the naked eye, appearing as small, white, and motile bodies.

Life History

The female mites are prolific, producing large numbers of minute, whitish eggs. The majority of these usually remain in the ears of the host, where they undergo an incubation characterized by the development of a six-legged larval mite within the shell. After hatching the larvae pass through a series of molts, in the course of which they develop a fourth pair of legs and arrive at sexual maturity.

Occurrence

Once ear mange is brought on a ranch, it usually spreads rapidly to practically all the foxes. It is present on a relatively large number of fox farms, though it is an easy disease to eradicate when the proper method of treatment is undertaken.

Mode of Transmission

Natural transmission of the mite and completion of its life cycle occur within a relatively short period, as is indicated by the fact that pups only three or four weeks old oftentimes are found to be heavily infested. Infestation apparently is spread chiefly by the mechanical dislodgment of mites and eggs when the foxes scratch the ears and shake the head in attempts to stop the itching. Under favorable conditions the mites and eggs so dislodged remain alive for a few days, or long enough to permit their getting onto a suitable host, frequently a different fox from that on which they were before. It almost may be possible that some of the mites migrate of their own accord from one fox to another.

Symptoms and Lesions

Many of the foxes that harbor mites show no apparent symptoms of infestation, except occasionally scratching the ears or shaking the head. In serious cases one or more of the following symptoms may be observed: A drooped or lopped condition of one or both ears, a foul-smelling exudate in one or both ears, wry neck, spells of turning in a circle, convulsions.

In the early stages of infestation the mites collect in the deeper parts of the auricular canal, particularly in the grooves. Sometimes they are there in such large numbers that they give the infested areas a whitish or frostlike appearance. The irritation caused by the mites makes the skin redder than normal. Soon a scaly material forms, and in course of time this is combined with or replaced by a profuse accumulation of a dirty, dark-colored and wax-like substance. The presence of this waxy excretion in profusion is quite characteristic in infestations of long standing.

After this excretion begins to accumulate the number of mites tends to diminish, but they seldom disappear entirely. Raw sores and thick scabs may develop, these usually resulting from injuries incident to the animal scratching its ears. Sometimes bacterial infection with pus formation in the deeper parts of the auricular canal may occur. The discharge in these cases invariably has a decidedly fetid odor. At times the progress of the inflammation may involve the middle and internal ear, and even the brain.

Treatment

Although a number of remedies have been recommended and widely used for the treatment of ear mange, several of these are either ineffective in killing the mites or are of physical composition that makes them unsuitable for the purpose for which intended. Among the remedies that have been found to be effective and satisfactory in other respects are:

1. Iodoform, 1 part; ether, 10 parts; and cottonseed oil, 25 parts.
2. Oil of cade, 1 part; and cottonseed oil, 8 parts.
3. Carbolic-acid crystals (phenol), 2 parts; and either cottonseed oil or liquid petrolatum, 98 parts.

Application of the remedy is by means of pledgets of cotton. These are saturated with the solution and the ears gently swabbed so as to insure coating the entire inner surface as well as the adjacent external portions. From 10 to 14 days later repeat the operation so as to insure the destruction of any mites that escaped the first treatment, as well as any that may have subsequently hatched from eggs. When the second treatment is given, remove all scales, wax, and other *debris* as thoroughly as possible. Proper care should be exercised, however, to avoid injuring any of the delicate structures in the deeper parts of the ear.

Eradication

The only efficient way of handling ear mange is to eradicate it, thereby eliminating the necessity of wasting valuable time and effort in treating the foxes for the disease at frequent intervals each year. The essential points to be observed in successful eradication are as follows:

1. Use an effective remedy and apply it thoroughly to the entire inner surface of the ears.
2. Treat all foxes on the ranch at the same time, starting in on those at one end and going right through the ranch until all have been treated.
3. Give all the foxes a second treatment after an interval of 10 to 14 days.
4. Disinfect the fox houses sometime during the period between the two treatments. A torch is useful for this purpose.

When ear mange has once been eradicated from the ranch, be on guard to prevent its reintroduction. Foxes coming from other places should be kept under quarantine and treated for ear mange before they are liberated with other animals on the ranch.

TREATMENT OF SNUFFLES IN RABBITS WITH CHLORINE[2] GAS

The chlorine-fumes are produced by the reaction of permanganate of potash upon concentrated hydrochloric acid (chemically pure), according to the formula: $2KMnO_4 + 16HCl = 2KCl_2 + MnCl_2 + 8H_2O + 5Cl_2$. During the reaction the liquid changes to a brownish color. Under simultaneous effervescence free chlorine is given off. Its presence in the air may be detected distinctly in a room by the odor. Two grams of $KMnO_4$ and 10cc of HCl (chemically pure, conc.) are necessary. Only half the amount of chemicals is needed if the room is saturated with water vapors (by boiling water). During the treatment the animals keep perfectly quiet. The rabbits are left in this atmosphere from 50 to 60 minutes. Improvement is noticed the following day. The catarrhal symptoms disappear entirely 3 to 6 days later. Although it is seldom necessary to repeat the treatment, repetition if required should not be given until after an interval of one week. Altogether 340 animals had been successfully treated by this method. No other remedies were used.—Fritz Volkmar.

[2] Tscheredkow, W. Treatment of Contagious Snuffles of Rabbits with Inhalations of Chlorine Fumes. *Tierärztl. Rundschau* 37 (1931): 105.

Treatment of the Diseases of the Eye and Accessory Organs*

The eye of the dog serves two functions, beauty and vision. The beauty is the more important in the dog. Such is not the case in other animals. Selective breeding, breeding to get a peculiar type of eye, is responsible for a great deal of ailments of this organ. It determines also the end to which treatment must be directed—to restore the normal appearance of the eye for the breed.

In many dogs, for example the Pekingese and the Chows, the eye is not important for vision, and in treatment of ailments of this organ in such animals, we give little thought to correct vision, but much attention to correct appearance.

Haw, or the enlargement of Harder's gland, is the commonest ailment of the accessory organs of the eye in the dog. Usually it does not affect vision, but where the gland is enlarged to a point where it is visible it is unsightly. A small enlargement of this gland is objectionable for the reason that it pushes the third eyelid up to a point where the eye appears less prominent than is desirable in some breeds.

In such cases, the removal of the gland from underneath the third eyelid allows it to settle back in place and greatly improves the appearance of the eye. As an anesthetic for this operation, I prefer a 1% solution of cocaine. It is hemostatic as well as anesthetic. If other local anesthetics are used, adrenalin should be used also, to control hemorrhage.

In the pop-eyed breeds, the removal of Harder's gland, where it is invisible and tucked well beneath the third eyelid, is a good operation and one that is needed far oftener than it is performed. It gives the eye an appearance of greater size and clearness.

Entropion is perhaps, next to haw, the commonest ailment of the accessory organs of the eye. In addition to being unsightly, it is one of the most painful of affections. One can realize that when they think what annoyance, irritation and pain result from the inturning of even a single hair in one's own eye.

Humanitarian reasons, if no other, call for early diagnosis and prompt treatment. For this operation, a combination of morphine and local anesthetic, preferably a 1% solution of butyn, should be used. It is important that the animal be operated on in a standing position and without undue relaxation of the tissues. It is essential, of course, that a segment of skin of just the right size be removed from the lower lid or the upper lid or both. Inturning of the lower lid is commonest. The ailment is seen more frequently in Chows than in any other breed.

The treatment of corneal ulcer, which is common in dogs, and particularly in the pop-eyed breeds, consists first of all in the relief of pain. The most important part of the treatment is to stop the winking and rubbing. When this is accomplished the other treatment is simple, provided only that irritant or caustic solutions or ointments be not used. For the relief of pain, no other agent equals a 1% solution of cocaine. This may be supplemented with anodyne or anesthetic ointments, but cocaine should be the basis of our treatment for relief of pain in these conditions and should be instilled into the conjunctival sack at least once daily. Oftener, if anodyne ointments are not employed. These cases do well when bandaged, a many tailed bandage, where practical, should be the one of choice.

Inflammation of the eyelids is a common ailment of dogs. The condition is often caused and always aggravated by rubbing and scratching. Continued use of moist packs is the best treatment and of these an Antiphlogistine pack is preferable to all

*Notes from an address by D. A. Eastman, Moline, Illinois, and discussions, at the Small Animal Section of the 68th Annual Meeting of the American Veterinary Medical Association, Kansas City, Missouri, August 25-28, 1931.

others. It should be changed as often as it becomes dry. It is important that it be not applied too hot. The eye is a delicate organ and, in addition to causing unnecessary pain, actual injury may be caused by applying the Antiphlogistine pack at a temperature that it would be proper to apply it in some other locations.

Abscesses may form in the eyelids and require prompt draining, preferably on the outside, to protect the cornea from infection. A picric acid ointment is useful in such cases.

Hydrophthalmus is a common ailment. The treatment consists in the relief of pain as for ulcer of the cornea. The continued use of atropine to prevent adhesion of the iris to the crystalline lens, draining the anterior chamber as frequently as it fills up and a pressure bandage.

Prolapse of the eye ball is unusually traumatic in origin. If seen immediately, the eye ball can usually be replaced. Sometimes it is necessary to clip the outer canthus to permit the replacement of the eye ball. The eye should be anesthetized with cocaine, the lids closed and a bandage put on which should be let remain for 24 hours. Where the eye ball is severely damaged, removal may be necessary, and in this case, the entire conjunctiva and tear glands also must be removed. Adrenalin should be used as necessary and the cavity packed. The pack and blood clots should be removed the next day through the inner canthus. After this acri-flavine jelly makes a useful pack for the cavity until it has filled up.

Many things taught in text books regarding the eye are not true. For one thing, the iris is always in contact with the crystalline lens and in any pan-ophthalmia measures must be taken immediately to prevent the adhesion of the iris to the crystalline lens or permanent injury to the vision will follow. Not only should the iris be dilated with atropine but the function of the iris should be protected. It is the function of the iris to expand when light falls on the eye and thus contract the pupil. By bandaging the eye and protecting it from light, we render easier and more lasting the dilation caused by atropine.

An excellent treatment, perhaps the most generally useful for eye inflammations, is the instillation of sterile milk. This, of course, resolves itself into protein therapy. Anyone can prepare sterile milk. It simply requires to take fresh cow's milk and boil it for two minutes.

Iodex ointment is a useful antiseptic and emollient treatment for the eye and its appendages. It should be applied plentifully every 12 hours. The eye should be bandaged.

Keratitis is common in the pop-eyed breeds. At maturity this "Peke" weighed only 19 ounces, including the eyes

In indolent ulcers of the cornea, a mercurochrome paste constitutes a useful treatment. Paint the margins of the ulcer. The eye can be examined with a magnifying glass to tell when more mercurochrome is needed. It is required when the stain disappears from the margin of the ulcer. Usually about every other day.

A florescein solution is most useful in examining the eye. It causes all inflamed and ulcerated portions of the cornea and conjunctiva to stand out distinctly and prevents one from overlooking small foci of infection.

Biological Relationships in the Control of Canine Taeniasis

By R. F. BOURNE, Fort Collins, Colorado

Distribution

THERE is probably no region on earth where dogs are immune to the danger of infestation with one or more species of tapeworm. However, there exist marked regional variations in the distribution of the various species of these cestodes, due largely to climatic and topographic differences with their resultant influences upon the fauna involved as intermediate hosts. Environmental differences within the same geographical area also play an important part in determining the types of taeniasis affecting the terminate hosts.

No one can say exactly how many species of tapeworms are properly to be regarded as parasites of the dog family, because some species found in dogs also infest other animals, including man. Then again there is considerable uncertainty regarding the specificity of certain closely similar forms, while no doubt still other species have not as yet been described. Good authorities list from twenty-five to thirty species of tapeworms which have been found in dogs, although some have been reported only rarely. About one-third of this number have a cosmopolitan distribution and well over half of them have been reported from North America. Yet probably the average small animal practitioner sees not more than half a dozen species in the course of a year's practice. It is probably also safe to assume that not more than half of our practitioners make any effort to determine the type of tapeworm present in any given case, a step which is of course necessary in identifying the source from which infestation comes.

Life History

While it is unfortunately true that the complete cycles of many tapeworms found in other animals are unknown, nearly all of those occurring in dogs are well known. In all cases these known cycles involve intermediate host animals, the concurrence of these intermediate hosts being a necessary factor in the propagation of any given species. A knowledge of these biological relationships is very necessary in any effort to control tapeworm infestation, yet many very successful practitioners seem to lose sight of this phase of the problem and often fail to recognize the larval forms of tapeworms when they see them.

What are the common sources of infestation and how are we to identify the different types of tapeworms which we recover from dogs? Taken as a group, tapeworms of man and the various domestic and wild animals, including birds, may develop from encysted larvae derived from a large number of vertebrate and invertebrate hosts. The list includes insects, slugs, snails, fish, reptiles, amphibia and numerous members of the mammalian class. However, from a practical standpoint, this list can be considerably simplified.

Differentiation of Species

Identification of the more common species of tapeworms is not always easy nor is it always difficult. Marked variation in size and other features are common and methods of preservation and preparation often play important parts in identification. All differentiations are based upon morphological characteristics such as size, relative dimensions of segments, size, number and arrangement of hooklets and suckers, shape and size of the scolex or head, position and number of genital pores, morphology of the reproductive organs and ova, color, and a few other features. If freshly removed specimens are placed in a basin of warm water and thoroughly rinsed to free them from extraneous matter, they may be separated from the mass and caused to assume a natural appearance, which greatly facilitates measuring and detailed examination. They

may be transferred later to 70 per cent alcohol or other preservative for later reference.

A method of quick preparation for microscopic study of parts which the writer has been using consists of placing such parts for a short time in a mixture composed of phenol crystals and chloral hydrate, of each, one part and acetone, two parts. Small specimens are clear and ready for study in a few minutes. The rostellum of hooklets can be cut free just anterior to the suckers and mounted like a rosette. Permanent mounts can be made directly in canada balsam although some shrinkage and fading of stained specimens will occur. Fresh material can be given a preliminary staining in dilute hemotoxylin, picric acid, picro-acid-fuchsin or other stains before clearing as above.

Common Tapeworms of the Dog

Among the more common species of tapeworms we find the double pored tapeworm, *Dipylidium,* which may infest the cat, fox and man, as well as the dog. These are readily identified by their characteristic cucumber seed-shaped segments, each with genital pores midway of both margins, as well as by several other distinctive features. The common species is *D. caninum,* the intermediate hosts of which are the biting louse of the dog and several species of fleas. This worm is not common in those regions where fleas are rare. Children may pick up infestation from the same intermediate hosts as the dog.

The fish tapeworms affecting dogs and belonging to the genus *Diphyllobothrium,* are easily identified by their elongated, club-like head bearing two slit-like suckers or bothria, very numerous, short but broad segments with the genital pores in a median position. This group represented by eight or more species, does not have a wide distribution although it is much more common in this country than formerly. Some of our northern lakes are heavily infested with the parasite in the form of plerocercoids contained in the flesh of parasitized fish. Ingestion of raw, parasitized fish is likely to lead to infestation in both man and dogs.

Doubtless the most common forms of tapeworms in dogs are those acquired from rabbits and hares, particularly in farm dogs, hunting dogs or others allowed to eat rabbit meat. Two species of tapeworms have their cystic stages in rabbits, hares or, less commonly in other rodents. The cysts of *Taenia pisiformis* are elongated bladders approximately one-half centimeters long, imbedded in visceral organs or free in the serous cavities. Adult worms are usually 1½ to 6 feet in length, among the largest of canine tapeworms.

The large cysts frequently found in hares, jack rabbits and other rodents, usually buried in intermuscular fascia or attached to visceral organs, contain the larval scolices of *Multiceps serialis.* Each cyst is studded with numerous clusters of such scolices, hence the generic name, multiceps. In some sections it has been estimated that fifty per cent of the jack rabbits are infested with cysts of this type. Ingestion of one of these cysts usually means massive infestation. The adult worms measure from 8 to 25 inches or more in length although when many are present, the tendency is for the individuals to be relatively small.

Another *Multiceps* found in some parts of this country is the "gid" tapeworm whose cystic form occurs in the central nervous system of sheep or other herbivora. Adult worms attain a length of from 16 to 24 inches.

Taenia hydatigena is another large tapeworm of the dog, at times attaining a length of five or six feet, although usually shorter. The cysts are large bladders occurring in the peritoneal cavities of ruminants and hogs and known to the meat inspector as *Cysticerus tenuicollis.*

The smallest of the tapeworms, *Echinococcus granulosis* consists of a head and three segments, the chain attaining a length of only ¼-inch. They are common parasites of dogs in Iceland and a few other limited areas, its most serious aspect being the fact that man is one of the intermediate hosts. Echinococcic cysts invade the various visceral organs of man and a number of other mammals where they may give rise to serious, even fatal, lesions.

In certain geographical areas other types of tapeworms are found in dogs involving such additional intermediate hosts as the reindeer, rats, mice and some of the cold blooded vertebrates.

Collections by Practitioners Desirable

Identification of tapeworms, as well as other internal parasites, should be attempted in routine practice in so far as it may contribute to a more accurate knowledge of treatment, prevention and possible bearing upon human health. Preservation of identified specimens is a valuable method of making later identifications by comparison. A table of frequencies can also be built up which will give valuable data regarding the incidence of the different forms of parasitosis.

Importance of Taeniasis

The importance of any given form of taeniasis depends not only upon the effect it may produce upon the terminate host, but often much more largely upon the extensive spread of the infestation to those animals which serve as intermediate hosts, where it may constitute a serious health problem.

NON-PARASITIC SKIN DISEASES OF DOGS*

Chronic dermatitis of the dog may result in either atrophy or hypertrophy of the affected part. The commonest mistake in its treatment is the use of irritant applications. The applications should be bland. In acute inflammation, use wet dressings. In moist eczema dusting powders are frequently employed, but they are inferior to wet dressings.

In chronic lesions of small extent, surgery is sometimes useful. Bacterins are frequently useful in the pustular forms of dermatitis.

Pruritis is a symptom of various disturbances, both internal and external. The cause in the particular case in hand should be determined. Drugs and soaps are responsible in some instances. Internal parasites, particularly tapeworms, are responsible in other cases.

Epinephrin should be used in urticaria in addition to the other indicated treatments.

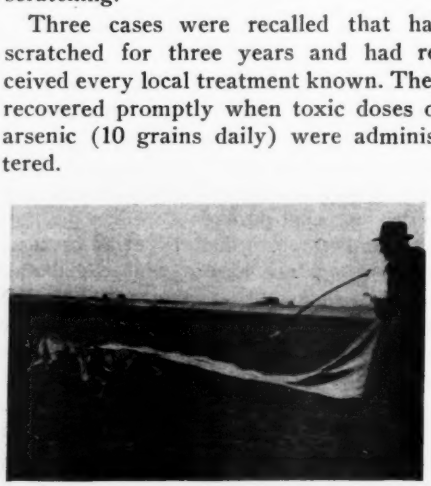
It is frequently necessary to go deeper than the skin to find the cause of dermatitis in dogs. Some cases that scratch all of the time without apparent cause respond nicely to the administration of vitamines B_2 and C in concentrated form. Gnawing at the root of the tail and even at the hind legs is frequently caused by infected and engorged anal glands. Chronic cases of anal gland infection, with fistulae are permanently relieved by irrigating with boric acid and then alcohol, allowed to dry and burn out with a 20% solution of silver nitrate. They require cleaning up the next day and in some cases, once or twice following that. They are usually well on to the way to recovery in a week.

Internal parasites, particularly tapeworms, is certainly one of the causes of moist eczema. Many cases of this ailment get well at once when the animal is freed of internal parasites.

Many cases of constant scratching are due to renal complications. A urine analysis should be part of the examination when a patient is presented with dermatitis of obscure origin.

Coccidiosis is a factor in some cases of scratching.

Three cases were recalled that had scratched for three years and had received every local treatment known. They recovered promptly when toxic doses of arsenic (10 grains daily) were administered.



*Notes from an address by E. C. Khuen, Chicago, Illinois, and discussions at the Small Animal Section of the 68th annual meeting of the American Veterinary Medical Association, Kansas City, Missouri, August 25-28, 1931.

X-Ray Technique

By RICHARD A. SELF, Dallas, Texas

A SUCCESSFUL small animal practitioner must make a quick, accurate diagnosis. A more careful examination is being demanded by the owner of pets, therefore the specialist must be equipped to make microscopic examinations, blood counts, urine analysis, etc., and base his diagnosis upon scientific findings.

One of the most valuable additions to the small animal practitioner's diagnostic equipment is the X-ray and fluoroscope. In this era of automobiles with resulting injury to hundreds of dogs, the X-ray and fluoroscope are most necessary for accurate diagnosis. It is easy to place the injured pet on a fluoroscopic table and look through him for fractures or displaced bones. Then to adjust those same bones under the fluoroscope where one can see whether the two ends are in apposition, and prevent the formation of false joints and crooked bones and hence crippled dogs. Then when the cast is applied it is most satisfactory to look again with the fluoroscope and see that the reduction is O.K. It beats having to wait until the cast is removed to find whether the leg is healed or unhealed and straight or crooked, due to displacement of the bones after it was put on or during the process of putting it on.

Fractures make up a large part of X-ray and fluoroscopic work, but the pet which the owner is positive has something in his throat or stomach is common enough. A few seconds time and the fluoroscope locates such object if it be there, and then the X-ray records the condition in a picture and the owner is satisfied. Certainly an important part of our work is satisfying our clients.

Bladder and urethral calculi are easily diagnosed and the owner can be handed a picture that explains why his dog is constantly attempting to void urine.

Then there is the bitch in which a picture through the pelvic girdle will disclose her ability or inability to have pups. Or, at whelping time, what a fine feeling it is to look through the bitch with the fluoroscope and be sure she is through whelping or to determine the size of the pups in case of dystocia. I might also mention here the fact that I have taken some fifty odd pictures of pregnant bitches to determine how many pups she carried and that such short X-ray exposures cause no trouble whatever.

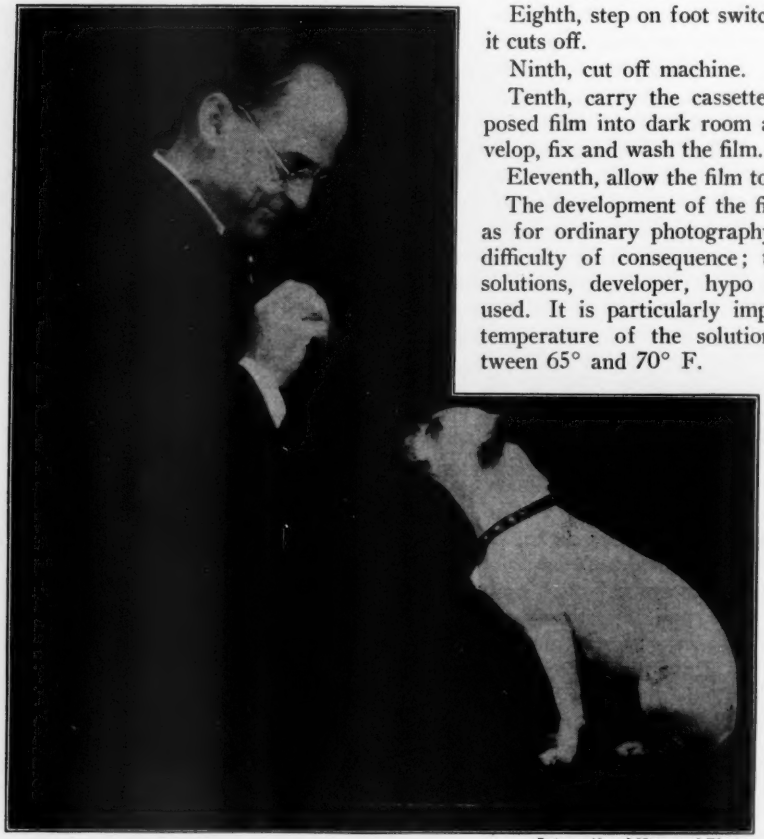
Gastric ulcers, lung and all internal pathology is diagnosed in dogs by means of the X-ray with little trouble.

My X-ray machine is my right hand man in my hospital. After three years use, I wonder how any practitioners get along without one. The initial investment is large, but the operative cost is practically nothing except for the films. I keep a complete record of each X-ray film exposed and through study of these films have developed a technique that I am really proud of. I have a five-inch gap machine; the ordinary dental machine of three-inch gap is not suitable for fluoroscopic work. My advice is to purchase a machine that may be used for fluoroscopic work as well as to take pictures. There is really more need for the fluoroscopic than the X-ray pictures. The operator of an X-ray apparatus must use lots of films to develop his technique. The size of dogs from toys to St. Bernard or Great Danes constitutes a wider field of study than the human patient. Then there is the problem of hair or fur: The more hair or fur an animal has, the more exposure and voltage is necessary. The operation of an X-ray machine is not just a matter of turning on the button and stepping on the switch, but truly a study in itself.

Pets will not lie still and hold their breath while their pictures are taken as will a human patient. I find it necessary to first administer morphine or the flare of the light or the noise of the motor will often cause the animal to jump. This results in blurring the film. The most satisfactory way to remedy such condition is to narcotize the animal and take faster pictures. To take faster

pictures, it is necessary to use what is spoken of as intensifying screens.

In fluoroscopic work, the tube is lowered under the table. I place the X-ray tube six inches under the table and use a voltage of 120 and 8 mil. amps. to get the best and clearest work. The tube should not be kept burning for longer than twenty-five to thirty seconds, or it may break from heat. This is the reason for putting the tube on and off in fluoroscopic work. Also, if one's eyes are dilated before attempting fluoroscopic work one will be able to see better. This dilation is accomplished by remaining in the dark four or five minutes before turning on the machine.



International Newsreel Photo.

Radio high frequency treatment is regarded as having been responsible for the recovery of this Boston terrier, belonging to the General Electric Company, Schenectady, N. Y., from what was thought to be an incurable stage of demodectic mange

The taking of the X-ray pictures is more complicated and I outline it as follows:

First, decide on the time and voltage that will be needed and set the machine and switch accordingly.

Second, try the machine to see that everything is O.K.

Third, reset the switch and turn off machine.

Fourth, go to dark room and load your cassette with the X-ray film.

Fifth, place cassette containing film under part of the animal to be photographed.

Sixth, make sure that the tube is directly over the area to be X-rayed.

Seventh, turn on machine.

Eighth, step on foot switch and hold until it cuts off.

Ninth, cut off machine.

Tenth, carry the cassette containing exposed film into dark room and remove, develop, fix and wash the film.

Eleventh, allow the film to dry.

The development of the films is the same as for ordinary photography and offers no difficulty of consequence; the usual three solutions, developer, hypo and water are used. It is particularly important that the temperature of the solutions be kept between 65° and 70° F.

If the picture is black it indicates too much exposure; if the picture is not clear, it is probably due to under exposure; if the picture has a yellowish tinge the developer needs changing.

Experience with my machine has led me to believe that exposures and voltage,

according to the following chart, are best for making good clear plates. The X-ray tube should be placed nearer the cassette for large dogs than for small dogs.

RADIOGRAPHIC TECHNIQUE CHART

Average Patient 40 lbs.: Use ¼ more time or ¼ less time per 10 lb. increase or decrease.
Size of Film: Use smallest size for area desired.
Intensifying Screens: Necessary for short time exposure.

Part	View	Kilovolts	Mil. Amps.	Focal Distance	Seconds Exposure Time
Chest	P. A.	120	20	28–32	2 Seconds
Femur	Lat. or P. A.	120	15	28–32	5 Seconds
Fibula and Tibia	Lat. or A. P.	100	10	28–32	4 Seconds
Digits	.....	75	5	28–32	2 Seconds
Head	Lateral	120	15	28–32	6 Seconds
Head	P. A. or A. P.	120	15	28–32	12 Seconds
Hip	A. P.	120	20	28–32	8 Seconds
Pelvis	A. P.	120	15	28–32	8 Seconds
Cervical	A. P.	120	15	28–32	4 Seconds
Dorsal	A. P.	120	15	28–32	8 Seconds
Lumbar	A. P.	120	15	28–32	12 Seconds
Teeth	.....	100	10	15	1½ to 3 Secs.
Stomach	P. A.	120	20	28–32	6 Seconds
Intestines	P. A.	120	20	28–32	6 Seconds
Colon	P. S.	120	20	28–32	6 Seconds

There is a satisfaction in having an X-Ray photograph of a broken leg after the cast is put on and being certain that the ends of a broken bone are in apposition.

Common Diseases of Stomach and Intestines in the Dog

By H. J. MILKS, Ithaca, New York

Examination of the Abdomen

LOOK at the abdomen from above and at the side. A distended abdomen with sunken flanks almost invariably means abnormal conditions and not fat.

The examination of the abdomen is not complete without palpation. Some practitioners palpate with both hands directed from above downward. Others use one hand, reaching up from the underside of the body. The stomach cannot always be located unless dilated or distended. The spleen is located and may be distinguished on the left side, but it may be confused with the liver which may be made out from both sides.

The intestines should be manipulated for obstruction, and although some form of obstruction is quite easily located its nature is not so readily determined. The results from palpation are rarely positive but simply indicate something abnormal in the abdomen. An exploratory laparotomy is often necessary to clear up the diagnosis. It is needless, perhaps, to state that one should be prepared to institute definitive treatment whenever an exploratory operation is made.

There are certain symptoms which tend to locate the disease in the stomach or bowels but even with these, diagnosis is not always easy because diseases of other organs have their effect upon the stomach and intestines or may be accompanied with the same symptoms. Even when the disease has been located in the stomach or intestines there is the further difficulty of determining whether it is of an organic nature or simply a derangement in function. It is necessary to remember that the stomach has important nerve connections with other organs and may react to or reflect disease of other organs of digestion such as the liver, spleen and intestines and at other times may be involved in diseases of other organs in no way connected with it, kidneys, liver, uterus. This makes a differential diagnosis exceedingly difficult unless a careful examination is made, because there are no symptoms which definitely locate the trouble in the stomach.

Vomiting is often considered indicative of stomach disorder but if one attributes all causes of vomiting to the stomach one will be lost at the start.

Briefly, vomiting is a reflex forward emptying of the stomach. Retching is just short of vomiting. In this case, the pylorus opens and the contents of the stomach escape in the intestines. Vomiting may be caused by directly stimulating the vomiting center as with apomorphine, or by stimulating the center indirectly through irritating the stomach walls as with irritant emetics. Its purpose is purely protective. It is nature's way of getting rid of an irritant and food is irritant if not digested. However, it often persists long after its purpose has been accomplished, and in some instances it is a symptom hard to explain.

The causes of vomiting may be located in the digestive tract or elsewhere. In the latter case we speak of it as reflex vomiting. It is not certain what causes the vomition in such cases, whether toxins, interference with digestion or what.

Diarrhea is another common symptom usually referable to the intestines. Its purpose is primarily protective, but like vomiting often persists beyond all reason and is hard to account for.

Indigestion

Indigestion is a term often used to cover our inability to diagnose with any degree of certainty. It literally means non-digestion of food and must be rare in animals not seriously ill. In a true case the digestive ferments would be at fault, yet it is claimed that there are few instances in which they are lacking. However, experience teaches the clinician that digestives often do well in combinations of several in order to hit the

right one. As in many instances in medicine, it is not easy to know how much of the benefit has been derived from the ferments and how much is due to other medicines, modified living conditions or to nature.

Acute Dyspepsia

This type of digestive disturbance is usually classed as overloading or dilatation of the stomach. The causes are too much food and too much appetite. The vomiting in these cases is purely protective and if the animal empties the stomach thoroughly little additional treatment is necessary. If he does not he becomes uneasy, salivates, retches, and tries to vomit.

Treatment—If the dog has not vomited, empty the stomach by giving a dose of apomorphine 1/20-1/10 grain. Apomorphine produces emesis almost if not as rapidly when dusted upon the conjunctive as when administered subcutaneously. This works rapidly and is not attended by much nausea or sickness. It tends, however, to make the dog uneasy instead of quieting him. Morphine will empty the stomach almost as rapidly and will keep the dog quiet. If the emetic does not give relief, irrigating the stomach with a weak (2%) solution of sodium of bicarbonate may be tried but in our experience no after treatment has been necessary. Any persistent pain can be controlled with barbital, chloral, etc.

Acute Gastric Catarrh

The causes of acute gastritis are not easy to determine even in animals kept under good conditions. Numerous negative histories lead one to believe that we do not yet know all about the condition. Gastritis is a more serious condition than dyspepsia. The vomiting is more persistent and distressing than in overloading. The temperature is about normal but may be slightly elevated, anorexia is partial or complete. The vomiting is always present and may be started by handling or by the sight of food. The vomitus consists first of food particles, later of mucus stained with bile which has been forced into the stomach by anti-peristalsis. Thirst is usually a prominent symptom and if allowed the patient will drink large quantities of water only to almost immediately return it and want another drink. The tongue is coated, the breath foul. It is not easy to say how much of the disturbance is organic and how much is functional. Gastritis is not liable to be overlooked but in the differential diagnosis several conditions must be taken into consideration. It must be differentiated from intestinal catarrh, deep choke, metritis, pyometra, ascites, jaundice and infectious hemorrhagic gastro-enteritis.

INTESTINAL CATARRH: The differential diagnosis of this disease from gastritis will be taken up under that head.

METRITIS: The symptoms of gastritis seen in metritis are anoresia and emesis. These are so common that the owner often says that the dog has indigestion. The history of such a case is that the bitch has recently whelped. She is usually prostrate, temperature high if taken early in the onset, the genital mucous membranes hot, swollen, tender and dark colored. There is a foul discharge from the vulva.

CHOKE: See symptoms of thoracic choke.

PYOMETRA: Vomiting is here a prominent symptom and unless there is some discharge from the vulva, the true condition is easy to overlook.

ASCITES: Vomiting is a frequent symptom often seen in late cases of dropsy due

Lavage and Gavage—Photo by Horning

to cardiac and liver disease. It would not often be mistaken for gastritis, but I have known it to be overlooked in animals that had previously been fat.

INFECTIOUS HEMORRHAGIC GASTRO-ENTERITIS: This disease may be confused with gastritis but its course is so rapid and the symptoms so severe that the mistake is not very liable to be made. I dislike to say anything about this disease because we see so little of it that I am in doubt whether it is the same as black tongue or not.

Treatment—If the stomach has not emptied itself it is well to use an emetic such as apomorphine but in our cases the stomachs are empty. The animals do not need an emetic but something to control the persistent and distressing vomiting, before we can hope to accomplish anything else with medicines. Since vomiting is a reflex, we may attack it in the center with sedatives such as the bromides, chloral, morphine, or any of the central sedatives; or we may treat it peripherally with antemetics. There are several groups of these. The first group comprises the protectives such as the bismuth salts, cerium oxalate, and chalk. The dose of bismuth or its salts is from 20 to 30 grains or more. These agents are employed ordinarily in doses that are too small to be of much use. The next group is the antacids, represented by lime water, sodium bicarbonate and the ammonia preparations. The antacids neutralize the acidity of the stomach and dissolve and thin the mucus. I believe they are important here for their action upon mucus. We have used sodium bicarbonate more than the others. It is a stronger antacid than lime water and not so irritating as the ammonia preparations. The other group of agents used are the local anesthetics and local anodynes. They include phenol, cocaine, butyn, anesthesin or as it is often called benzocain, or any of the members of the group which act upon sound mucus membranes. Procaine and apothesine are not very useful upon mucus membranes. A mixture of the members of different groups is often useful. We have for years used a combination containing of phenol, 1 minim, bismuth subcarbonate 10gr. sodium bicarbonate 5gr. and water to make a dram. The dose is one or two teaspoonfuls as necessary. Creosote 1 minim, or cocaine ⅛ grain may be substituted for the phenol or the dose of phenol may be doubled without any fear or harm. In extremely obstinate cases we use 1gr. of cocaine hydochloride to the ounce of water, giving a teaspoonful as often as they vomit. Many dogs will drink this preparation from a dish or spoon. Sometimes we give a dose of the cocaine or other anti-nausea mixture, 20 minutes or so before attempting other treatment. We find this a useful measure where vomiting is started by handling or where there is a tendency to vomit medicine.

Lavage and Gavage—Photo by Horning

After the vomiting has been controlled we administer a laxative of some kind, castor oil or a mixture of castor oil and liquid petrolatum. In cats we prefer liquid petrolatum.

Sometimes it is best to prescribe a combination of a local protective or sedative along with a central depressant. Chloretone serves both purposes. A combination of the bromides or chloral, etc. with bismuth often does well. These central depressants simply depress the vomiting center until it does not pay any attention to the impulses coming to it from the stomach.

I have left the care until the last. The food and water should be restricted. It is best to remove all food for 24 hours. Water or liquid must be limited to a few laps at frequent intervals or a couple of spoonfuls at half-hour or hourly intervals. Allowing the animal to lick ice will aid in relieving the thirst but things must be arranged so that he cannot get the water that comes from the melted ice. A 2% solution of common salt in tablespoonful or ounce doses is often useful and in some cases the animals crave it. This is practically a half-teaspoonful of salt to a glass of water.

The animal may have water or salt solution per rectum, in amounts small enough to be retained, in order to supply fluid and prevent dehydration. Normal saline solution may also be administered subcutaneously, or intravenously. One of the main factors in serious cases is to supply fluid to the body. After vomiting has been controlled small amounts of food may be given at short intervals and increased very gradually as the animal improves. The return to a normal diet should be slow.

If the animal shows a great deal of pain, one of the barbitals, chloral, etc., may give relief.

We are not always successful in controlling or stopping the vomiting and the reason is not clear. In many instances autopsies reveal conditions we did not suspect and that are beyond remedying even had we known the exact condition. Occasionally the animal may live for several days after vomition ceases and then die. I am not able to explain this except on the theory of dehydration.

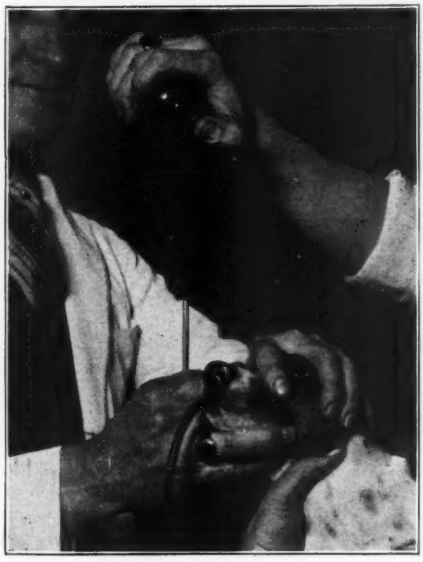
Intestinal Catarrh

It is easier to differentiate intestinal from gastric catarrh in carnivora than in other animals. Generally speaking there is vomiting in gastritis and purging in enteritis, but vomiting may accompany intestinal catarrh. Diarrhea is rarely absent in intestinal catarrh.

The character of the feces varies from a mushy to a fluid condition. They contain shreds of food, mucous and are sometimes streaked with blood. The characteristic hook worm stool is chocolate or dark brown in color, due to the presence of partially digested blood. Not all cases of hook worm disease have this color and when it is present it usually means that considerable damage has been done by the worms.

There is much straining. The anal mucous membrane is relaxed and often prolapsed. The urine is scanty and high colored. The temperature slightly elevated. Palpation over the abdomen may cause pain. When the condition is severe, prostration comes early; the animal is down and unable to rise, the abdomen is tucked up, temperature and pulse go below normal and the animal is in collapse. Sometimes the prostration comes early. This is especially so in infectious enteritis of cats, and infectious hemorrhagic gastro enteritis of dogs.

The diagnosis of enteritis is not quite enough. The cause should be looked for and it should be determined whether the condition is due to the different kinds of worms or posibly to coccidia. It is needless to point out the inadequacy of treating an enteritis due to hook worms as an ordinary intestinal catarrh. We find a microscope



Gavage—Photo by Horning

a great aid to our diagnosis in cases of intestinal catarrh.

Treatment—This must vary with the patient. If there is reason to believe that the irritant has not been passed, we administer a dose of castor oil, and follow if necessary with intestinal antiseptics, carminatives, protectives and astringents. Among the antiseptics may be included salol, aspirin, and the sulphocarbolates. Ginger, capsicum and ammonia are the carminatives most useful. Bismuth salts in large doses serve as protectants and the tannic acid containing drugs and opium are the astringents. When there is reason to think that the irritation is well posterior in the bowels, as is shown by the presence of shreds of mucous in the stools, there is nothing so servicable as a colonic irrigation. Saline solution per rectum or by hypodermoclysis are useful to prevent dehydration.

Jaundice

This is a serious complication in the dog. It is a symptom of some damming up of the bile. It is shown by the same symptoms as gastritis plus the icterus, low or subnormal temperature and nervous disturbances, at first consisting of excitement, delirium or convulsions which soon give way to depression and coma.

The treatment has not been promising. Some have reported success with glucose solution subcutaneously.

Acute Obstruction of the Bowels

This may be due to twist, hernia, foreign body or intussusception but this differentiation as to cause is often impossible unless a laparatomay be made. In intussusception a peculiar sausage shaped mass that is freely movable may be palpated.

Endoscopy—Photo by Horning

The symptoms of acute obstruction from whatever cause are quite constant. Vomiting is common and the nearer the obstruction is to the stomach the more the vomiting. At first the vomitus consists of food particles and mucous, then bile and finally it is fecal. Fecal vomiting has been said to be a sure indication of some form of acute obstruction, but more recently it has been said to be a sign of impending death.

Other symptoms are sudden violent pain which often occurs after severe exercise, purging or worming. Bloating is said to be common but we have not noticed it. Constipation is common after the material posterior to the obstruction has been passed, except in intussusception in which bloody mucus may be evacuated.

In certain cases vomiting or other leading symptoms do not occur and a diagnosis must be made from the examination.

The course of acute obstruction is fairly rapid, extremely so in intussusception. Many dogs live several days with a foreign body in them.

Diagnosis—Fecal vomiting is diagnostic but it is also a symptom of impending death so that we must not wait for it. The animals do not always vomit and often exhibit no characteristic symptoms so that unless we pin all our faith in obscure cases upon an X-ray examination, palpation of the abdomen is all we have to depend upon.

Treatment—This is operative and often through an exploratory laparatomy. No one should attempt an exploratory laparatomy unless he is prepared to cope with the conditions found. Purgatives do more harm than good. Large doses of depressants only mask the symptoms and lead to errors in prognosis. With the exception of cases of intussusception enemas are harmful and in intussusception their value is questionable. Saline solution by hypodermoclysis or per rectum may aid in maintaing the strength of the animal and prevent dehydration which appears to be the cause of death in many cases.

Examination and Interpretations of the Analysis of the Urine of the Dog

By C. E. HAYDEN, Ithaca, New York

Quantity and Its Significance

WE ARE limited in our interpretations of the results obtained from the analysis of the urine of animals to observations carried out upon single samples of urine. Specimens have been collected for the 24-hour period, but not enough has been done to set satisfactory standards for such a period. We know about what the amount of urine for the dog should be in 24 hours. This is one of the first things to be considered in routine urine analysis work. The 24-hour quantity eliminated by the normal dog varies from 200cc to 1000cc. The normal variations will depend somewhat upon the size of the animal, the habits, and methods of feeding. Variations in quantity depend oftentimes upon purely physiological factors. The quantity of fluid, exercise, temperature, the nature and quantity of the food taken are factors which help to govern the quantity of urine eliminated.

It is not often true but it does happen that the quantity of urine is no index of the condition of the urinary system, or the conditions of other systems of the animal body. Most increases or decreases are explainable by the nature of the symptoms and the results of the urinary examination. Increases in volume may be accounted for on the basis of diabetes mellitus, diabetes insipidus, nervous disorders, contracted kidney, anyloid degeneration, and convelascence from acute disorders in general. Drugs may be responsible and this possibility should be checked in deciding the importance of a polyuria. Some conditions which cause a decrease in the quantity are acute nephritis, diseases of the heart and lungs, fever, diarrhea, vomiting, and retention of the urine.

A consistently large volume of urine with a low specific gravity is an indication of diabetes insipidus. As I consider the volume eliminated I always think in terms of specific gravity. The volume which indicates diabetes mellitus is accompanied by a definitely higher specific gravity than in the case of diabetes insipidus. A test for sugar is always indicated when a large volume gives a high specific gravity. There are exceptions to all rules and this relation of volume and specific gravity sometimes has its exceptions. I have never yet had a complete, 24-hour sample from a dog. Such indications as we have which help to relate the volume to the diagnosis are that the elimination is copious, scanty, apparently normal, or is being retained. It would be difficult for practitioners ever to collect samples for a 24-hour period. A standard of normal quantity based upon a much shorter time unit for the dog is most desirable and such a standard we hope to establish. The volume eliminated by the dog is an important index to kidney function. It should be given more careful consideration.

Specific Gravity

When a sufficient quantity of filtered urine is available we always take the specific gravity. The normal range for the dog is quite wide. The range is usually given as 1016-1060. The breed, food, fluid taken, and exercise tend to govern the variation. I have encountered very few samples with specific gravity as high as 1060. In my opinion 1015-1050 might mark a better normal variation with an average nearer 1035. As I write I have before me the analysis of 100 different samples of dog urine sent me from patients in the Small Animal Clinic of the New York State Veterinary College. The specific gravity of these samples ranged from 1004 to 1070. It is almost impossible

to enumerate the number of deductions which might be made from this reading.

A low specific gravity always sets one to thinking of a possible albuminuria with the accompaniments of nephritis. The low figure does not always check with an albuminuria but it very often does. The low figure leads one to suspect diabetes insipidus, malnutrition as evidence of disturbed metabolism, or a lack of kidney function which leads to the retention of urine constituents in the blood with the possibility of resulting uremia. One has to balance these things against the injection of fluid, use of drugs, and foods which may cause a physiological increase in the volume of urine excreted with a lowered specific gravity.

Significance of Color

The normal color we find to be golden or rather yellowish. Standing will often bring about a change of color. The tendency is to darken. The two changes against which we most frequently have to guard are the reddening due to hemoglobinuria or hematuria, or both, and the color imparted by the excessive elimination of bile. The practitioner will usually know the type of drugs used in treating a case, and color out of the ordinary may at times be attributed to such a cause. Unfiltered samples may show a reddish coloration due to the deposit of urates or of uric acid crystals. The proof that the color is due to these two substances lies in the microscopic examination or in the application of heat to some of the unfiltered samples. Urates tend to clear up when gentle heat is applied. Indol is said to be present at times in quantities sufficient to color the urine. I have never met with this bluish-black discoloration in the course of several thousand examinations of urine samples from different sources.

The blood red color of urine due to blood elements, the greenish or greenish-yellow or dark brown due to bile, and the light or brick red of the urates or uric acid are the changes in color which must be interpreted most often.

A whitish or milky color is imparted to urine by fat or leucocytes. The microscopic examination is the most certain method for checking this color. Leucocytes in numbers sufficient to give this color are a sure index of purulent infection at some point along the urinary tract. I find at times that organisms lend a white opalesence to unfiltered urines so as to make it unsafe to state on microscopic examination alone that the white is due either to leucocytes or organisms.

The color interpretations are very important.

Reaction

The normal reaction of dog and human urine is acid. That of the dog is higher than the human. Reading acidity in degrees we say that the normal reaction is 30 to 40° per 1000cc of human urine. A reaction of 30 to 70° is a better range for the urine of the dog. The diet must always be taken into account when reaction is being considered. A vegetable diet makes for a weaker, a protein diet makes for a greater acidity. Urines collected 1 to 2 hours after a meal will show less acidity. The production of HCl in the stomach draws on the acid elements of the blood, and leaves fewer of these elements to be eliminated in the urine and so the acidity is apt to be lowered.

We veterinarians have not yet come to fully appreciate the importance of the proper balance between the reaction of the body fluids and tissues and that of the urine. This balance is more essential to the proper function of the body than we know. The reaction in pathological conditions will vary quite a bit. In a considerable number of examinations of pathological urines we have found a few alkaline, many in a normal range of acidity, and some very high. The greatest acidity was 270°. The record of the analysis of this sample showed a marked nephritis. Such samples as show a low acidity or are alkaline, always put me on my guard against the possibility of cystitis or of retention. With a reaction high in acidity one should always consider the possibility of unsuit-

able diet, nephritis, or of wasting diseases being the underlying pathology. Diet, age of the sample, time of collection, cystitis, and urinary retention are among the possible causes of low acidity or even alkalinity.

Importance of Turbidity

The study of the translucency of urine is of considerable help. Clear human urines are normal. It is rare that we get a perfectly clear sample from any of the domestic animals. If the turbidity or cloudiness are not inherent to the sample they can usually be found to be due to extraneous matter added in the course of collection. One must distinguish carefully between such substances and those that are eliminated from the urinary tract along with the urine.

There is a type of parasite, called Tyroglyphus longior, which thrives on carbohydrate material left in bottles or other containers. This parasite can be confused with the Sarcops. Even if the parasite is the sarcops it is extraneous in origin and has dropped into the sample in the course of collection. Fecal matter sometimes contaminates the sample and even parasite eggs may be added from that source and must be excluded from the diagnosis so far as the urinary system is concerned.

Turbidity can often be traced to cellular material due to desquamation; cloudiness to leucocytes or bacteria or both, to crystals such as oxalates, phosphates, urates, or uric acid. It will bear repetition that if the unfiltered sample shows a red turbidity or cloudiness, blood elements or the uric acid crystals and urates are quite likely responsible.

It is interesting and instructive to check your observations as to what the turbidity or cloudiness of urine might be due with the microscopic examinations of such samples. It pays to fix in mind the normal translucency of urine for a proper comparison with the translucency of pathological samples.

Solids

The average practitioner does not have time to interest himself in some of the normal organic and inorganic constituents of the urine going to make up the solids which we determine on the basis of the 1000cc. and the 24-hour elimination.

The determination of the solids and the constituents which go to make up the solids is at times of extreme importance. The normal constituents in the solids for which we test as a matter of routine are chlorides, sulphates, phosphates, urea, uric acid, and indican.

Chlorides—The chlorides are important because they constitute one of the two chief solids of the urine. Urea is the other of these two solids. The chlorides depend upon the quantity in the diet, water consumed, and exercise taken. Much in the diet and much water taken increase the chlorides. Exercise tends to decrease the chlorides. A low chloride elimination may be the result of fevers, chronic nephritis, pneumonia, diarrhea, stomach disorders, or even acute rheumatism. With the formation of an exudate as in pneumonia the chlorides may fall to zero. Their increase in the urine in such cases is a favorable sign. They are important in many of the body functions; their increase may lead to harmful effect on the kidney, their lack may lead to the death of an animal due to the lack of the sodium of the sodium chloride. The quantity of chlorides in

1000cc. of normal dog urine should be from 6-10 grams.

Phosphates—Phosphates in 1000cc. may vary from 1-2.5 grams. An increase in the phosphates may be an indication of bone disease such as periostitis, osteomolacia, or rickets. A decrease may be an indication of fever, may occur in pregnancy, and may be evidence of non-elimination as a result of nephritis. The phosphate content gives the diagnostician more information than the sulphates. Less than 1.5 grams of the sulphates in 1000cc. may be an important indication of decreased metabolism resulting from malnutrition.

Urea—Urea is one of the important solids in the urine of the normal dog. Marked decreases in the urea must be checked with decreased metabolism, marked liver disorders, or severe and advanced cases of nephritis. Marked increases must be checked with toxic states or acidosis. Urea is one of the substances which contribute to the syndrome which we know as uremia and uremia generally accompanies advanced cases of nephritis. I consider its determination and the resulting interpretations of extreme importance.

Uric Acid and Urates—There is said to be very little uric acid in the blood of the dog. We get rather high readings in the urine. Its status is somewhat uncertain and so we cannot attach so much importance to this substance.

Indican—Indican is said to be a measure of intestinal putrefaction. We have been told that its determination is important as a means to suggesting intestinal disorders. It has been held that the increase is due to the putrefaction of proteins in the intestine. It has been shown that it may result quite as readily from the putrefaction of carbohydrates. Indican does serve as an indicator of the intestinal condition. Its presence in more than normal quantities in the blood leads to elimination through the urine and proves irritating to the urinary system. It is easy to test for and the test should be a part of every urine analysis.

Albumin—We always test for albumin, bile, and hemoglobin. These are the most important of the abnormal organic substances found in the urine. There is discussion as to whether albumin in minute traces might not be physiological. A considerable experience in the examination of urines leads me to doubt it. The good, ordinary tests for albumin fail to show positive in normal urines. The late Dr. P. A. Fish conceived one of the most sensitive contact tests I have ever used. When this test indicates the presence of albumin almost 100 percent of the samples will show evidences of pathological changes which may account for the albuminuria.

Suspected urines should always be tested for albumin. The presence of albumin may be ascribed to a number of different conditions. It may be pre-renal. Albumin of this source may come from circulatory disturbance such as heart disease, or from digestive disturbances. Albumin may be renal in its source. When inflammation of the kidney or nephritis is the source we can quite often find casts and renal cells in support of the idea that it is renal in origin.

Albumin may be post renal in its origin. This means that the albumin comes into contact with the urine at some point below the kidney. Pyelitis, cystitis, even inflammation of the ureters or urethra may be responsible for this last type. It may come as a result of strains or injuries. The microscope is quite indispensable to the interpretation of albuminurias.

A pre-renal albuminuria may be suspected by the absence of any formed elements such as leucocytes, cells, casts, or red cells. This examination checked with the symptoms may lead one to the examination of the circulatory, respiratory, or digestive systems for the source of the albumin.

The renal type of albuminuria can be decided most often by the presence of formed elements such as casts and blood cells, sometimes, but least often in my experience, by the presence of renal cells

in the sediment taken for microscopic examination.

The post renal type of albuminuria is diagnosed by the absence of renal elements and symptoms and by the presence of cells which are peculiar to the pelvis of the kidney, to the bladder, or to the ureters or the urethra.

The reaction will sometimes help to check the source of the albumin. A high acidity often is found in pyelitis, a low acidity or alkalinity is often an index of cystitis. The microscope and the reaction of fresh urines containing albumin will often determine the source and cause of the albuminuria.

Albumin is incidental to many disturbances. Injury to large areas of the skin, infected areas, poisons, disturbances of the blood, pressure from tumors, and many other conditions lead to its elimination in the urine. Things of such a nature which may happen to an animal will generally appear in the case history and their influence can be eliminated in deciding whether the albuminuria is renal or not.

A renal albuminuria of increasing severity most often indicates a nephritis which leads to fatal results. More frequent examination of urine samples from dogs thought to be normal would be of great help to early diagnosis and to a more favorable prognosis.

Sugar—Sugar may appear in the urine in small quantities and from a number of different causes. These conditions should be considered in order to guard against their leading to worse things. The continued elimination of sugar is open to suspicion of diabetes mellitus or renal disorder. Renal diabetes does occur but it is rare. To determine the reason for occasional small eliminations we should look to the diet and general condition of the patient. In the elimination of large quantities we need to consider the possibility of diabetes mellitus. This is best done by making a simultaneous determination of the blood and urine sugar to see whether or not the sugar of the blood is above normal. A blood sugar reading of 200 mgs. per 100cc. accompanied by 25 grams per 1000cc. of urine would be a most certain diagnosis of diabetes mellitus. Lesser figures than I have given would indicate it too. The average blood sugar level in the dog is around 80mg. to 100cc. of blood and the sugar of normal urine is nil.

Diseases of the nervous system, circulation, digestion, liver, and pregnancy lead to sugar elimination and where there is any considerable amount of sugar in the urine it should be checked against the blood sugar to eliminate the possibility of diabetes mellitus. Dogs do have diabetes. They should be handled and treated very much as human beings with the same disorder.

Bile—Bile is to be suspected from the color of the urine. A greenish yellow to greenish brown is a strong indication of bile in the urine. Checked with the icteric condition of membranes and chemical tests of the urine its presence can be shown easily.

The presence of bile in the urine most often indicates a disturbance of the liver or of the intestines or of both. Icterus is at times hematogenous in origin. Such a form is rare but occurs as a result of the destruction of large numbers of red cells in the blood stream with an increase of free hemoglobin in the blood.

A simple test for bile is to sprinkle a little sulphur on the surface of some of the filtered urine in a small graduate set on a level surface. If bile be present the sulphur can be seen sinking to the bottom. There are other more elaborate tests, but I find this quite satisfactory and accurate for most samples.

Blood—It should be easy to recognize blood in the urine, but it is not always done. It appears in the form of hematuria or hemoglobinuria or both. Hematuria is shown by the appearance of red cells in the microscopic examination. Hemaglobinuria is revealed by a positive test for hemoglobin. The spectroscope gives a two banded spectrum (in the green) in the presence of oxy-hemoglobin. Boiling some filtered urine to which a few drops of a 10% solution of NAOH have been added will bring down a yellowish cloud of phosphates if hemoglobin is absent, a red cloud if it is present. The wine color of pathological urine is often due to hemoglobin.

Hematuria or hemoglobinuria may be pre-renal, renal, or post-renal. Diseases of the blood, calculi, parasites, strain or injuries are some of the common causes of bloody urines.

Blood from the kidney is apt to be accompanied by bloody casts in the urine. To say that blood comes from the ureters, the bladder or the urethra depends pretty largely upon the microscope and the history of the case. The cystoscope or X-ray must sometimes be used to locate the source of blood.

Rabies—Photo by Gaurd

Microscopic Examination

The first thing one should do in starting a urine examination is to shake the unfiltered urine and fill a 15cc. centrifuge tube in order to get sediment for the microscopic examination. The supernatant urine is poured off after centrifuging for three minutes. One drop of the sediment furnishes enough material for one slide. If one does not have a centrifuge the sediment in most samples will settle in a short time and a drop of this can be taken for the slide.

The presence of an occasional epithelial cell has no particular significance. Any considerable number, especially in the urine of the male, indicates desquamation due to pathological conditions. Some profess to be able to locate the seat of the urinary trouble by the type of cells found.

I am not always able to do that. I can sometimes say that most of the cells come from the kidney, the bladder, or the urethra. Sometimes it is difficult to say just where they do come from. The extent of the disturbance is indicated often by the type of cells and the amount of the desquamation. Casts, bacteria, epithelial cells, red cells, pus cells, parasites, parasitic eggs, cylindroids, and amyloid bodies represent the usual range of organic or organized bodies found under the microscope.

Casts are formed in the tubules of the kidney. They are regular in outline in that the ends are rounded and the sides are parallel. Many types are recognized. Hyaline, epithelial and bloody casts are rather characteristic of acute attacks of nephritis. Granular, fatty, and waxy are said to indicate chronic nephritis. I often find hyaline, granular, and epithelial in the same slide. Acute and chronic stages must at times be existent in the kidney

during the same attack. The two groupings of casts, in the main, help to distinguish between acute and chronic nephritis. Portions of mucous, clumps of crystals or bacteria and cylindroids may be mistaken for casts. A drop of acetic acid will dissolve the true casts quickly. Once you are sure of true casts they can indicate nothing but nephritis. The kidney is their only source and they are formed only under adverse conditions in the kidney.

The true significance of bacteria can be determined only upon bacteriological examination. Such an examination should be made on a catheterized specimen. The type of organism often determines the treatment and prognosis.

The presence of red blood cells or leucocytes can be demonstrated only upon microscopic examination. Red cell casts and pus casts are sometimes observed. They indicate clearly that the source of the hemorrhage or purulent foci are in the kidney. That they come from the lower part of the urinary tract must be left in part to the history and to the finding of some characteristic epithelial cells. Cases of acute nephritis are often prolific in both these elements.

It is seldom that I have found parasites or parasite eggs in urine. When parasites are found they may be extraneous. In some cases they are due to the collection of the urine in soiled containers. The finding of parasites is rare enough that it is better to subject them to detailed study before passing on their importance. It is embarrassing to say that a parasite is a scabei and find out that it is a *Tyroglyphus longior*. To say that an external parasite is responsible for a nephritis, pyelitis, or cystitis is likewise embarrassing.

Cylindroids often come in for interpretation. Cylindroids are many times longer than casts and one end at least is tapering. They are said to have no particular significance but must be scutinized carefully to keep from calling them casts. I sometimes wonder if they are not at least second cousins to casts.

Amyloid bodies in urine are common. They show best when the material on the slide is stained with iodine. They are of course blue. I have seen microscopic fields well sprinkled with them. They are said to be associated with cystitis. I have found them most numerous in urines associated with marked disturbances of metabolism. It is possible that they have no great significance but they are found not infrequently and must be considered.

The microscopic examination of urine is of the utmost importance. It is best to go over a slide with the low power and using little illumination. Suspected bodies are studied with the high power and the illumination governed accordingly. Casts, especially, may escape notice if there is too much illumination. They are sometimes destroyed entirely in an alkaline urine and other constituents such as albumin must be depended upon to diagnose nephritis.

Numerous types of crystals are to be met with in the course of an extended experience in urine analysis. Uric acid, urates, oxalates and phosphates are the crystals most often found in the urine of the dog and man. It must be kept in mind always that the number of crystals may be out of proportion to the quantity of the salt from which the crystal may be formed. The quantity of soluble phosphates in a urine may be low but the crystalline phosphates bulky. The number of any type of crystal found under the microscope may depend more upon a slight change in the chemical reaction of the urine. A urine normally acid becomes faintly acid or alkaline and its salts may precipitate to form many crystals.

I would object to the feeling that finding crystals in the sediment indicates the presence of calculi. This may be true but most often it is not. The presence of calculi needs to be checked by other means such as the X-ray or actual

palpation. The continued elimination of crystals unquestionably leads to the formation of calculi.

Triple phosphates most often occur in the form of prisms. Their continued presence may indicate such conditions as paraplegia, chronic cystitis, or chronic pyelitis.

Uric acid crystals and urates quite often cause the brick red color of unfiltered urines. These crystals may indicate gouty or rheumatic conditions, acute febrile conditions, or interstitial nephritis.

Oxalate crystals are octahedra or dumbbell shaped, most often octahedra. They are quite apt to indicate disturbance in diet or metabolism. These crystals, in common with uric acid crystals, occur in more acid urines. The acidity of the sample and the sharp edges of uric acid or oxalate crystals lead to irritation of the urinary passages which must not be overlooked in diagnosis.

The mortality in dogs with post-mortem evidence of marked nephritis is considerable. More frequent and earlier urine examinations might make diagnosis, treatment, and prognosis of such cases more helpful. The testing of urine should be a more general practice among veterinarians. It is relatively simple to do such things as specific gravity, reaction, albumin, sugar, bile, hemoglobin, and the microscopic work.

Significance of Blood Examination

When one considers that much of the organic and inorganic material of the urine is pre-formed in the blood the examination of the blood looms more important. In the diagnosis of kidney troubles, urea, uric acid and creatinine are found in the urine, they are normal to the blood. These things are not eliminated in sufficient quantity in the urine when the kidney is in bad condition. They increase in the blood as a consequence and the blood readings become a better criterion of the diagnosis and prognosis than the urine analysis.

Sugar is normal to the blood and not to the urine. The sugar of the blood must increase before the kidney shows evidence of diabetes mellitus. If there is any considerable quantity of sugar in the urine the check with the quantity in the blood is invaluable.

The proof of uremic poisoning can be clinched by the reading of certain constituents which are being retained in the blood. Urea, uric acid, and creatinine are among those constituents.

Urine examinations will prove of much greater value when they are accompanied by quantitative blood analysis for some of the constituents common to both blood and urine.

Routine Examinations and Findings

When a sample of urine is brought to our laboratory from any of the clinics we consider the amount, specific gravity, reaction, color, translucency; solids, chlorides, phosphates, sulphates, urea and uric acid per 1000cc., indican, albumin, sugar, bile, and hemoglobin. In the microscopic examination we look for epithelial cells, leucocytes, red cells, casts, bacteria and crystals. The types of crystals most often observed are uric acid, urates, triple phosphates, and oxalates. The sum of these routine observations will often lead to important conclusions as to diagnosis, treatment and prognosis.

Thirty-three out of 100 samples of dog urine brought to us from the Small Animal Clinic of the New York State Veterinary College showed more or less evidence of nephritis. Some of the 100 showed too much sugar, some contained bile, some showed hematuria or hemoglobinuria or both, some showed evidence of cystitis, a few showed evidence of primary intestinal disturbance. The information gained has been helpful and instructive. It is too bad that many of these cases are not presented sooner for urine examination; it is too bad that some of the urine examinations could not have been accompanied by a chemical examination of the blood. The information from both blood and urine would be more helpful and instructive.

Running Fits or Canine Hysteria

By W. E. FRINK, Hollywood, California

THE condition of fright disease or Running Fits, or as we prefer to term it "Canine Hysteria," has received its share of attention; not all of it confined to the profession. Individuals owning one dog as well as those conducting kennels, have been interested in determining the nature of the affection, its cause and some method of relief. As there is so great a difference of opinion among veterinarians, regarding these factors, it is only natural that much has appeared from the pen of the laity in those publications devoted to the dog. Its prevention has received less attention, as the probability of its occurrence is not usually considered until it appears.

In our practice we are more in touch with the individual dog owner than with the breeding establishments. However, we do know that the condition appears wherever dogs are kept confined and fed on a restricted diet, but rarely in dogs that are fed plenty of meat and are living a normal life in the great open spaces. We have, however, seen it in country dogs that were fed largely on starchy foods.

The condition may appear anywhere at any time, in animals of any breed or mixed breeds, at any age. Although we have found it more common in the German Shepherd, Airedale and other Terrier breeds, it is also common in collies; but we do not find the toy breeds as often affected. But breeding, or lack of it, is not important in the occurrence of this disease.

At times we have noted that the condition assumes the nature of an epizootic. This will continue for a few days or weeks after which we have only isolated cases over a period of weeks or months when it seems to suddenly, from no apparent cause, "flare up" again. These epizootics usually involve a large territory, even one or more counties. However, in my observation there is insufficient evidence to justify the conclusion that the disease is contagious.

The symptoms are too well known to need much description. The expression we so often hear over the telephone that, "Our dog has gone hay-wire," is quite descriptive as the time necessary for an apparently docile dog to be transformed into a raving maniac, temporarily blinded, and possessed of a resolute desire "to be where it ain't" at any cost, leads the owner to assume that the animal has suddenly become affected with almost all the diseases a canine may contract.

Quite frequently the disease is confused with rabies by the layman; particularly by the police, who may be called in to quell the disturbance caused by the family pet starting on a rampage. There is no doubt but that many animals have been put to death summarily on the supposition that they were rabid when they were in reality victims of canine hysteria.

We have noted that the attacks which terminate in a spasm or convulsion are more apt to be prolonged to recur and consequently are more serious than others. These cases in young dogs may be associated with or terminate in distemper regardless of whether or not the animal is placed in the hospital for treatment. For this reason, we always recommend a liberal dose of homologous distemper serum and qualify our prognosis by a consideration of the possibility of this disease. The temperature of the animal at the time of an attack is not significant as it may be high in a mature immune dog. In these cases the fever will subside rapidly as soon as the patient becomes quiet.

The choice of sedative or hypnotic to control the hysteria depends upon the case and the conditions. If immediate control is necessary, as is usually the case where the animal is in the home, subcutaneous injections of H.M.C. or morphine

sulphate ¼ grain to ten pounds body weight is prompt and effective. These agents usually empty the stomach, which is desirable. Barbital, luminol or chloral may be used and the maximum dose is usually necessary. We have used sodium amytal in a few cases with satisfactory results when given in proper dosage, which we find to be three grains to ten pounds' weight. The effect of amytal sodium is prolonged, making it a very satisfactory drug for hospital use.

Once the animal is quiet we attend to the elimination either by intestinal irrigation or saline cathartics or both.

While the cause of canine hysteria is debatable, it appears to us to be induced by the feeding of a restricted diet over a considerable period, coupled with a lack of the proper amount of vigorous physical exercise, the consequent indigestion acting as the exciting cause. The presence in the stomach at the time of an attack, of quantities of undigested food and very frequently much foreign material, is proof that the digestive functions are far from normal. There is the possibility that this condition is the result of earlier unnoticed symptoms and that the exciting cause is more of the nature of a toxemia.

Considerable difference of opinion exists as to the importance one may attach to the presence of intestinal parasites. We do not think it an important factor although in cases of heavy infestation it could aggravate the intestinal disturbance.

It is quite certain that the nervous system is set on a hair-trigger needing only the slightest unusual exciting agent, such as the noise of a door bell or the slamming of a door, the dropping of a pan or dish or frequently an automobile siren, to disturb every organic function and the train of symptoms that immediately appears depends largely upon the vitality of the subject and the available acreage where his performance may be staged.

Acting on the theory that the predisposing cause is dietary, we attempt to correct possible deficiencies with the injections of solutions of calcium salts and the feeding of plenty of meat, preferably ground lean beef, as much as two pounds daily to a twenty-five or thirty-pound dog. This is divided into three feedings per day and supplemented with cottage cheese or buttermilk if the animal will take them. Occasionally "Viosterol" or cod liver oil is added if the physical condition of the patient indicates it.

The prognosis is as the student wrote in answering an examination question, "Favorable in selected cases," the difficulty is that the practitioner has little opportunity to choose his cases and I can think of no situation more trying to the busy man than leaving his office in response to a "hurry" call and upon arrival finding that "Pal" or "Buddy" has driven the family to the roof while he has retreated to the cellar and is firmly wedged under the furnace from which only physical force will remove him. None of the family will assist in this, as the dog must be mad and after all, what is the Doctor there for, if not to take charge of the situation? The humor in some of these is great if one can see it.

A large percentage of cases recover under proper treatment and some without medication if attention is given to correcting the diet. The tendency to recurrence, one or more attacks each day for a week or more, is quite common in untreated cases; this is also noted in cases that are complicated by distemper. These last are always grave as they are apt to terminate in epileptic attacks.

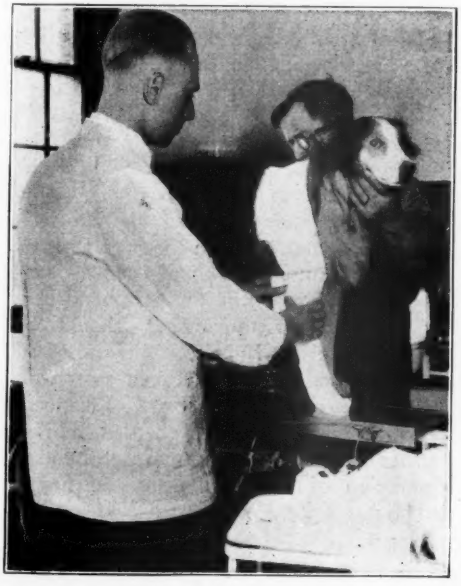
A few cases develop meningitis after

Tonsilitis—Photo by Horning

repeated attacks, become paralyzed, perhaps blind, and never recover, and a small percentage injure themselves more or less seriously during an attack. Our instructions to the owner, when we receive a house call, to confine the animal if possible in a room where it cannot escape or injure itself, is good advice if it can be followed, as it may prevent damage to the dog or furniture and saves time on our arrival. We have known several cases that were killed in the street as they dashed blindly into motor traffic.

We find that our general instructions to owners, to feed plenty of lean beef at all times, is helpful in preventing canine hysteria, as we are rarely if ever called to treat animals where this practice is followed. This is one of the reasons why we believe the condition to be dietary and that lean meat should be the principal diet of dogs kept under unnatural conditions.

After all, the successful handling of cases of this malady as they arise in practice, with the consequent hysteria of the owner and neighbors, is what differentiates veterinary practice from other vocations and helps to make it a real art.



HEMORRHAGIC AND NECROTIC PANCREATITIS

The patient was an obese ten-year-old German Shepherd dog. He had been sick for five days before being brought to the clinic. Veterinarians who had previously examined this dog had diagnosed an intestinal obstruction and arsenic poisoning from medicinal doses of arsenic which had been given some time previously.

The dog was very weak and depressed. He was thirsty, but vomited quickly after drinking. The temperature was 103.0° F., the respirations rapid and shallow, and the pulse faint and weak. The heart was palpitating. Palpation of the abdomen was negative in regard to an obstruction or abnormal condition of the palpable viscera, but some fluid was found. X-rays were negative. A tentative diagnosis of gastritis was made, although it was recognized that some more chronic and serious condition accompanied the gastritis.

When the owners were convinced that he would live only a few hours, the animal was destroyed. On postmorten examination Doctor Olafson found the pancreas to be swollen to two or three times the normal thickness in the central part, although the head and tail showed only slight swelling. The surface was covered with a purulent exudate that caused adhesion to surrounding viscera. Dull, greyish, irregular areas of fat necrosis were present along the entire pancreas, and were scattered throughout the omentum. These areas were invariably surrounded by hemorrhage.

The gall bladder was moderately distended, but the bile could be easily expressed. No calculi were present, and the bile duct appeared normal. The pancreatic ducts showed no gross involvement. There were also a red tinged fluid in the abdominal cavity, and free blood in the stomach. The gastric mucosa was diffusely reddened. The liver and kidneys were slightly paler than normal, and the intestines appeared normal. However, all these conditions, including the local fibri-

nopurulent peritonitis and the fat necrosis in the omentum and along the pancreas were thought to be secondary to the hemorrhage and gangrenous pancreatitis.

The source of the infection was undetermined, although it was thought that in spite of the apparently normal condition of the pancreatic ducts, the infection might have been ascending through the ducts.

Discussion

This condition is extremely rare in veterinary as well as in medical practice. The following abstract is from Hutyra and Marek: there may be no digestive symptoms in a disturbed condition of the pancreas, because the pancreatic juice can be replaced by other digestive juices and intestinal bacteria to a certain extent. An abnormal condition of the pancreas may be manifested by insufficient digestion of fat, and consequently by fatty stools in carnivora—stools which have a grey discoloration and a fatty gloss. Incomplete assimilation of proteins in the food may also cause the appearance of visible remnants of meat with stainable nuclei in the feces. The sugar metabolism may also be deranged, resulting in the production of diabetes mellitus.

Schmidt's nucleus test shows the inability of the pancreas to digest the nuclei of cells. Pieces of muscle tissue 0.2cm to 0.5cm are hardened in alcohol and then washed in running water for an hour. They are sewed in a piece of gauze and given to the animal to swallow whole. The gauze bags are easily found in the feces, and the muscle fibers are stained with hematoxylin. If the nuclei can still be demonstrated in the muscle cells, the absence of trypsin and consequent functional derangement of the pancreas is shown. A simpler nucleus test is the same method with washed and dried nucleated red blood corpuscles of birds used in place of the gauze bags of muscle fibers.

Another test is the adrenalin mydriasis test. Three drops of a 1:1000 solution of adrenalin are placed in the conjunctival sac at intervals of five minutes. If the pancreas is severely affected, dilatation of the pupils takes place, caused by the absence of the inhibitory action of the internal secretions of the pancreas upon the sympathetic nervous system.

The above description, of course, points to any derangement of the pancreas, and not specifically to necrotic pancreatitis. However, it enables the clinician to limit his diagnosis to the affected organ. Actual suppuration of the pancreas has been recorded as caused by the presence of a foreign body in Wirsung's canal (the excretory duct of the pancreas) in two instances in the horse and one in the dog, although the exact route by which a foreign body becomes lodged in the canal has not been determined. In each case the symptoms were a loss of appetite, emaciation, occasional attacks of colic, and a susceptibility to pressure in the hypogastric region. The fact that this condition invariably occurs in very fat and aged dogs aids in the diagnosis.

Ithaca, N. Y. D. B. Crane.

CAUSES AND TREATMENT OF PRURITIS IN DOGS[1]

Examination of pruritis patients must include the examination of the feces, urine and eventually the blood. Taeniae and oxyurides are the cause of many a pruritis; their toxins also produce exanthemata. The most frequent cause of pruritus are the nephritides. Kidney and skin are excretory organs which supplement each other and are intimately connected with one another. Pruritis may also be caused by stimuli from the central nervous system and the peripheral nervous system. Ecto-parasites should be watched for also. In spite of the use of all diagnostic aids there still remain cases with absolute negative findings. Treatment should consist in changing the diet, administering laxatives, intestinal antiseptics, stimulation of the metabolism and finally narcotics.—Fritz Volkmar.

[1] Krack, Pruritus in Dogs. *Tierärztl. Rundschau* 37 (1931): 251-254 & 268-269.

Hospital Hygiene and Sanitation

By S. W. HAIGLER, St. Louis, Missouri

THE old adage, "Cleanliness is next to godliness," applies very forceably to the modern dog and cat hospital. Never before in the history of veterinary medicine has the public demanded so high a degree of sanitation, as is required of the small animal hospital of today. In the olden days, it was entirely logical for a veterinarian to have his office or hospital in a barn. Ninety per cent of his work was horse practice. Today, the small animal hospital must equal the sanitary conditions of his patient's home life. We might ask, what are these conditions? The majority of our patients are pets. They live, eat and sleep in the home. The average American home is clean and sanitary. Then, is it not logical for owners to demand at least a clean, comfortable, sanitary hospital for their pets?

We are living in an age of advanced hygiene and sanitation. The old grocery stores are being replaced by fine sanitary markets. A modern school building is the last word in sanitation, and the little tots in the elementary grades are taught hygiene and sanitation. And so it is right down the line.

The veterinarian that is conducting a dog and cat hospital today faces an opportunity that is twofold: the opportunity to render a more efficient service to his client, and an opportunity to elevate the veterinary profession in the eyes of the public. Not only does a clean and inviting hospital tend to accomplish this, but it will increase one's business, which, after all, is to a large extent the public's measure of success or failure. In our endeavor to carry out a program of hygiene and sanitation, we should not overlook the business side of our practice. It is well to emulate the methods that obtain in human hospitals in so far as it is practical, but we must realize that the fees for our hospital services are limited. A hospital must be a paying proposition to be successful, and it behooves every veterinarian conducting such an institution to maintain the highest degree of sanitation commensurate with the fees that he obtains for such service.

The hygienic condition of a hospital depends primarily upon two factors:

1. Hospital construction.
2. Cleaning methods.

In the construction of a new hospital, or remodeling of an old building, the first thought should be directed toward hygiene and sanitation. Regardless of the size of the building, or the money to be expended, the following questions should be answered: Can this place be thoroughly cleaned and kept clean with reasonable effort? Is the ventilation and heating problem properly taken care of? Is the drainage and sewer system adequate to take care of present and future needs?

To clean and keep clean with the least possible effort, I would first direct attention to the floors. These should be constructed of some impervious material such as terrazzo, tile, various compositions, concrete, etc. I prefer terrazzo because of its durability, beautiy and the ease with which it is kept clean. Other hard surface floors are equally good and are preferable under certain conditions. Cove base construction of floors is desirable, as it eliminates corners and cracks which catch dirt and filth. Walls and ceilings should be smooth finish construction that can be kept clean and attractive.

Ventilation and heating: Without proper ventilation, no small animal hospital is an inviting place for visitors or clients. Where a number of aminals are kept in any building there are bound to be disagreeable odors, but this objection can usually be controlled if reasonable precautions are taken. Upon arrival at the hospital in the morning one is greeted by a decidedly stuffy and disagreeable odor. Our routine method of controlling this is as follows: All dogs are removed from compartments of a given ward to the exercising yards. Windows and doors are flung wide open (winter and summer), papers or bedding removed and ken-

nels are thoroughly washed with hot water and soap. Sometimes we use hydrated lime or a pine oil disinfectant. Then the ward is swept and all refuse taken to the incinerator. The ward is likewise washed and allowed to air out for fifteen to thirty minutes. Patients are then brought back and placed in clean quarters. Windows are left open, but door is closed to prevent too much draft. There will be no appreciable odor if this method is properly carried out.

Our instructions are for all windows and doors to be opened the first thing in the morning. This includes entire hospital, front and rear. One objection to this is that in very cold weather the building gets pretty chilly, but if adequate heating facilities have been provided the temperature is easily controlled. Do not forget that unless eliminated those disagreeable odors will creep up to the front office regardless of how careful one may be. When one is sitting in the office for some time one does not notice the stuffy atmosphere; but step outside for a few minutes into the fresh air, then come in, and one can appreciate why people remark that "this smells like a dog hospital."

There are various deodorizing agents, including the highly perfumed, that may be used, but, to my mind, they are useless and objectionable. When a golden tongued salesman tries to sell me these products, I simply say to him that if there are objectionable odors around my place I want to be the first one to know it, and I will remove the cause. I always feel that these agents are more or less used to "cover up" an insanitary condition that should be eliminated.

Other sources of odors are from the drug room, waste cans that are not emptied regularly, and dirty blankets, mops, etc., which are allowed to lie around. Odors from drugs, chemicals, etc., that are not particularly objectionable to the operator, may not be so pleasant to Mrs. Jones. A neat and tidy drug room with clean and well corked bottles can never be listed as a liability in a small animal hospital.

Drainage and sewer system should be kept open and well cleaned at all times. A stopped sewer or drain is responsible for of an unhealthy condition if not taken care the most offensive of odors, and is the cause of properly. This applies particularly to an old building, because there is no excuse for putting in an inadequate system in a new building.

Cleaning methods: Various cleaning methods are used in different hospitals. It doesn't really matter what methods are used so long as every spot on which filth can accumulate is thoroughly scrubbed or what agents are employed for scrubbing so long as they are soap and hot water. There are a number of good neutral soaps on the market that will not injure painted surfaces and are desirable cleansing agents. A coat of paint twice a year will brighten up the interior of wards and make cleaning easier.

Where strong disinfectants are constantly used in an effort to keep quarters sanitary, there is present the inevitable odor of the disinfectant, which permeates everything within the hospital, including one's clothes. This leads to a condition from whence came the expression, "He smells like a horse doctor."

PROLAPSE OF THE VAGINA

Within the last few months two cases of prolapsed vagina have been presented at the time of estrum. The first one, a Springer spaniel, was operated upon under local anesthesia, procaine being used. The prolapse was drawn out and a sizable section removed and the incision stitched for the most part with catgut with an occasional suture of silk. The after treatment consisted of douching with antiseptics and swabbing once a day with acriflavine jelly.

On the fourteenth day of estrum she was bred and whelped a litter of nine pups.

The second, a pointer, was placed under ether anesthesia and operated upon and treated as the first. She bred on the thirteenth day, and in due season whelped a litter of seven.

Previous to these two cases, I had made it a practice not to treat the condition until after estrum, postponing the operation. However, from the above results, I believe it good practice to operate at once.

Albert E. Merry.

Syracuse, N. Y.

Fractures in Small Animal Practice

By EDWIN R. BLAMEY, M. R. C. V. S., New York City

A FRACTURE is defined in the American Medical Dictionary (Dorland) as (1) the breaking of a part, or (2) a break or rupture in a bone. The latter definition is accepted generally by veterinarians when speaking of the dog.

Fractures are classified for purpose of description according to anatomical location. A simple fracture is one in which the overlying integument is intact. A compound fracture is one in which there is an external wound leading to the break in the bone. A comminuted fracture is one in which the bone is splintered. A greenstick fracture is one in which one side of the bone is broken and the other side bent. There are many terms used in describing fractures, but there is no need to define them because their meanings are self evident.

Causes.—Most fractures are due to an accident of some kind. Automobile injuries and jumping from high places are among the most common causes. In young dogs, and in very old dogs spontaneous fractures occur occasionally. In the former it is due to immature development of the bone. In the latter to brittleness due to an increase of mineral matter and decrease of animal matter. In both classes violent muscular effort or sudden movement is involved.

Diagnosis.—In many cases this is comparatively simple. One essential factor is a good knowledge of osteology and arthrology. Without this prerequisite, the veterinarian who attempts to "set" broken bones is injuring his own reputation and that of the profession as a whole. In simple cases of fracture involving the long bones of the legs, careful palpation and manipulation are sufficient usually to reach a definite conclusion. In my practice I have made it a rule to confirm my tentative diagnosis by an X-ray examination. It is my custom to have two plates made of the injury, anterio-posterior and lateral. Sometimes it is expedient to have the plates made before the final setting is made. At other times it is necessary to have the plates made while a temporary dressing is in place. Those surgeons who are fortunate enough to enjoy the use of a fluoroscope may employ it during diagnosis and for the subsequent operation.

During palpation and manipulation, it is generally possible to feel the crepitation caused by the friction of the rough surfaces of the broken bones. Absence of crepitation should not be considered as positive evidence that a fracture has not occurred. In the case of puppies, the soft cancellated tissue may not crepitate. Often it is impossible to get crepitus in epiphyseal, diaphyseal, spiral and longitudinal fractures. It is difficult also to detect crepitus if the fracture has occurred some time before the patient is presented for treatment. Swelling due to contusion of the surrounding tissues may mask crepitus.

To sum up: Diagnosis in fractures depends on accurate knowledge of anatomy backed by the use of the X-ray, the fluoroscope, or both.

Treatment.—As a general rule, hospitalization is recommended, at least during the first few days. Healing of bone lesions in the dog fortunately is quite rapid. This is so especially when the patient is under complete control during the first week or ten days after it has been injured. Occasionally certain individuals suffer from an acute form of nostalgia and hospital treatment is contraindicated.

First aid generally is applied by the owner.

When a fracture is suspected, the injured part should be bandaged as quickly as possible. If it occurs in a limb it is wise to apply a temporary splint of thin wood, cardboard or stiff wire. Chafing is prevented by a liberal use of cotton or some other padding. If there is a compound fracture the skin wound should be cleansed with any available antiseptic, any protruding bone should be returned to as near a normal position as possible. A wet antiseptic dressing should be applied. Then movement may

be limited by the use of splints and a bandage.

If the patient is suffering much pain, morphine, or some other sedative should be administered. If an animal is allowed to suffer unnecessarily, the resistance is lowered and healing is retarded. Humane reasons demand the use of a sedative. Furthermore, handling of the patient is facilitated.

As soon as an accurate diagnosis is made some definite line of treatment should be planned and executed. In the case of simple, comminuted, greenstick, and similar fractures of the long bones, I prefer the use of splints.

The patient under a narcotic or general anesthetic, is placed on its side on a flat topped table, and held in that position by an assistant. The injured side should be uppermost. The injured leg is extended by traction and the ends of the fractured bone are brought into correct apposition by digital manipulation. The leg, including the foot, is padded with the best grade of cotton. Poor cotton lacks resiliency and may lead to pressure necrosis. The padding is secured by the use of gauze bandage. For this purpose I use, and recommend, narrow sizes varying in width from one to two inches, according to the size of the patient and the position of the break.

Splints may be applied at this time. They may be made of thin pliable wood, whalebone, thin flatstrips of steel or stiff wire. In fact, anything which is not cumbersome and too heavy, but which will give the necessary support, may be employed.

After the splint has been secured in place by sufficient bandage, it may be finished off with a light layer of plaster of paris bandage, waterglass bandage or by the use of a covering of surgical adhesive plaster. For many years I have used light splints, and adhesive tape to reduce fractures of the long bones. The method has the advantage of regidity and lightness without undue bulk. It is reasonably waterproof. It is difficult for the patient to remove it by gnawing. It is almost completely translucent to X-ray and permits inspection by the fluoroscope. And finally it is repaired easily or kept clean by the application of an additional layer.

When splints are used they must be long enough to reach well beyond the joint on each side of the fracture. When short splints are used it is impossible to prevent movement of the injured ends of the bone. The result is delay, unnecessary pain, and deformity. Splints should be used at least on two sides of the broken bone. Frequently the best results are obtained by the employment of three or four long narrow splints. Great care should be taken in applying splints and bandage. There is a marked tendency to rotate the foot. If this is allowed, the foot will toe in or out as the case may be. The result will be deformity. The use of cardboard or any substance which will become soft when wet is to be avoided.

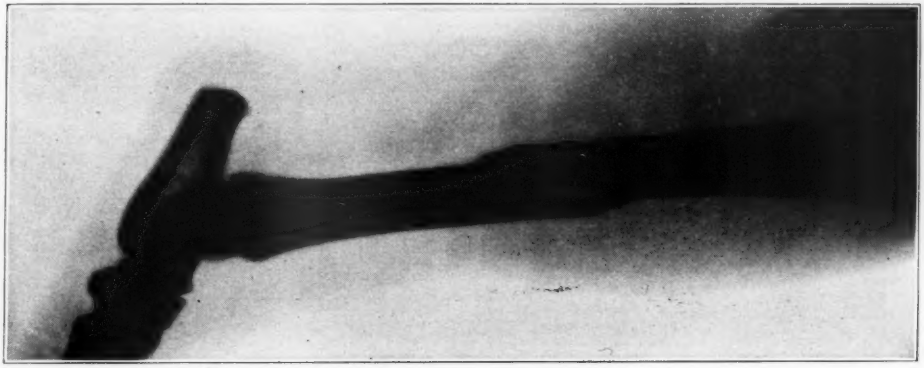
Some able practitioners use a plaster cast or a waterglass cast in the reduction of a fracture. Occasionally I have observed

Fracture of Radius and Ulna—Airedale.

casts built up of glue and superimposed strips of bandage or canvas. When nothing else is obtainable, there is an excuse for glue and such things, but I consider it far from dignified. When surgical materials are obtainable they should be used in preference to substitutes. In my experience the rest results are obtained by the use of the finest materials obtainable. For instance, cheap badly made surgical adhesive tape is difficult to apply because it ravels and is not adhesive and it does not remain in place. Cheap cotton is useless because it has no resilience and allows pressure areas to develop. Cheap bandage ravels and does not apply evenly.

In bandaging, the tendency to cause rotation may be overcome by reversing the direction of the bandage. Run the first two layers from the right to left, or clockwise. Then run the next two layers counterclockwise. When plaster of paris bandage or adhesive tape is used, it is advantageous to apply it in the same manner.

The treatment of fractures of the scapula or femur give much trouble because of the lack of control of the patient. In these cases it is best to bring the ends of the injured bone into correct apposition and to hold them in place by means of a cast. This is fixed correctly by bandages and pads. The former must encircle the body, and involve the leg on the opposite side. Femur fracture in the male may give trouble because there is some difficulty in arranging for the penis. Usually this may be overcome by the use of longitudinal pads on each side of the organ. Liberal padding should be used over the scrotum. If the encircling bandage must be carried forward a window may be made for the anterior end of the preduce. To prevent fouling it is well to line the opening with one or two layers of oiled silk or other waterproof material. The same method is applicable to the handling of situations involving the vulva in the bitch.



Spiral Fracture of Tibia—Fox Terrier.

Fractures of the radius or the femur may require tension to overcome the displacement caused by muscular stress. The weight and pulley method used in human surgery is not practical. Stiff wire or metal lath strips may be bent into form of braces. These are secured in the bandage of the lower extremity and made a trifle longer than the leg in repose with the bones in position. The upper end of the brace is then molded over the body and fastened by the encircling bandage. These braces must be fashioned by the surgeon because the size and shape of the individual patient varies too much to use stock appliances.

Fractures of the pelvis usually heal spontaneously if the patient is kept under restraint. Complete rest should be prescribed. When possible use a cage or kennel with sufficient floor area for the dog to lie down extended. When the acetabulum is involved I find it best to enclose the pelvis and thigh on the injured side in a cast. Treatment

similar to that prescribed for fracture of the upper third of the femur will suffice.

Fracture of one or more of the ribs is treated most successfully by manipulation to bring the broken ends into correct relation. Usually there is little or no displacement. The chest wall is bandaged. Over the bandage place strips of adhesive tape each long enough to encircle the chest. These strips should be arranged so that they cross. In this way the movement of the

Fracture of the pelvis with displacement

fractured ends is limited and more rapid healing is promoted.

Fractures of the spine involving the neural canal usually result in permanent parplegia. In most cases, it is humane and expedient to recommend destruction of the patient. Sometimes the owner wishes to attempt treatment. The only recourse of the surgeon is to place the entire body in a plaster cast. Often these cases are fatal.

Fractures of the skull are rare and usually result in death. I have seen several cases which did not cause death and healed spontaneously without any treatment. In the case of the lower jaw surgical treatment sometimes is successful. If the fracture is between two teeth it may be reduced by the use of silver or platinum wire. Skilled surgery is necessary. Holes are drilled through the bone on each side of the break. The sterilized wire is passed through the holes and drawn up tightly enough to bring the ends together. The ends of the wire are then secured by twisting. If the fracture involves one of the molars it is best to extract the tooth before wiring. A common fracture of the inferior maxilla involves the symphysis. Often it heals spontaneously Sometimes the two parts may be held together by wiring, and sometimes an attempt to bind the canine teeth together with wire or catgut is met with success.

Comminuted fractures in general require the same treatment as simple fractures. Greater care is necessary to place the broken pieces of bone in their correct positions. A common comminuted fracture involves the distal end of the radius, the articular head parts from the shaft transversely, and the two articular condyles split with an anterio-posterior fissure. The two fragments thus formed are forced apart and the distal ends of the radius and ulna are brought into apposition with the fractured end of the shaft of the radius. Usually it is necessary

to give the patient a general anesthetic to overcome the muscular stress. The line is extended and the fragments placed in position. They are held in place by an encircling bandage of adhesive plaster. Then the leg is set in a plaster cast. Unless great care is taken, there is grave danger of displacement which will result in anchylosis of the joint and permanent lameness.

Compound fractures may be treated by the conventional manner. On account of the common methods of antisepsis are observed.

Under ordinary circumstances, splints or a cast should be kept on for three or four weeks. In the case of young puppies, the whole dressing should be removed and replaced every week to ten days to prevent the development of undue pressure. It is a great mistake to remove the fixation dressing too soon.

The after-treatment of fractures consists

Fracture of Sacrum—Scottish Terrier.

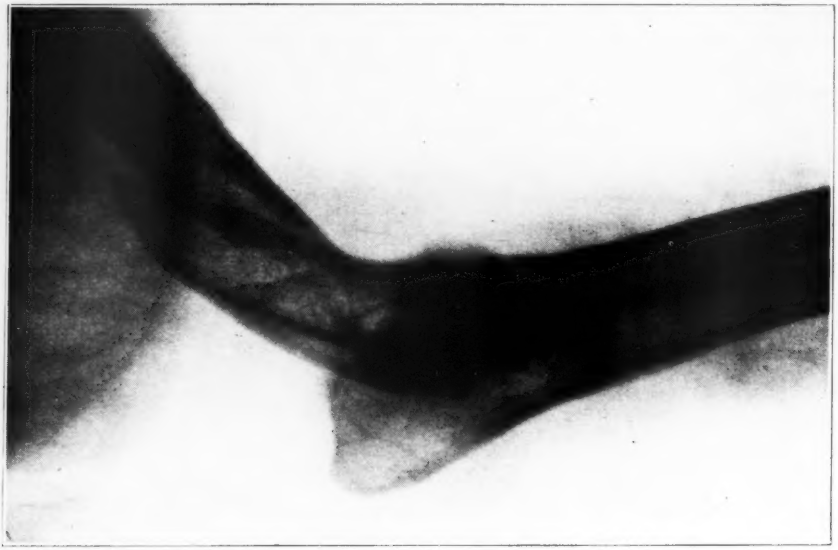
the skin wound, it may be necessary to use a temporary dressing with splints and adhesive tape until the healing is well under way. If an X-ray examination reveals detached fragments of bone it may be necessary to remove them under local or general anesthesia. Whether a temporary or permanent fixation is attempted, it is always imperative to make provision for access to the wound. Usually this is done by making a window or opening in the dressing and lining it with oiled silk or rubberized tissue. If the wound is deep drains should be used. If superficial and uninfected, a dry dressing may be sufficient. In any case, of massage, which may be simple or medicated. Exercise may be given during treatment provided it is controlled by keeping the patient on a leash. It should not be commenced for at least ten days after application of the permanent dressing. Often it is better to place the dog in a recumbent position and gently work the leg to simulate walking. If there is considerable pain after the dressing is removed, it may be relieved by daily use of the ultra-violet rays produced by a quartz burner or special carbon arc lamp.

Special splint wood may be obtained from surgical instrument supply houses. It is

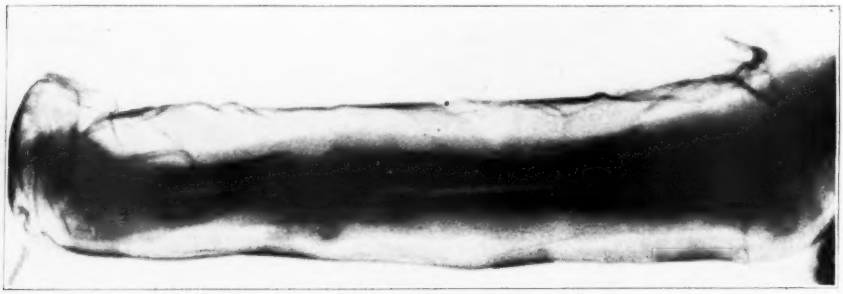
made in several thicknesses and usually in standard size plates about six by eighteen inches. I use ordinary human tongue blades as splints for small dogs. The work of setting fractures will be facilitated by the use of the best grade of bandages, adhesive plaster and surgical cotton. If the cotton is not resilient there is danger of pressure necrosis, which must be guarded against in every case.

It is my custom to watch the patient's temperature during treatment for a fracture. If there is a rise which cannot be accounted for in any other way, I remove the dressing, make a general inspection of the covered parts, and replace everything as soon as possible.

The callus formation in the average case is rapid. In most cases there is a fairly solid union in eight to ten days. It is not safe, however, to allow the average case to go without support for at least three weeks. In the case of young dogs, and grown dogs of the heavier breeds, it is often necessary to wait for five or six weeks before the support is removed. In some cases it is wise to compel the patient to wear a supporting bandage for a considerable time.



Fracture of Humerus—Collie Puppy.



Reduced Fracture of Radius and Ulna. The Leg Is Set with Splints and Adhesive Tape.